AIRWORTHINESS NOTICES

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§ These Notices contain information that could affect the safety of the aircraft.

AIRWORTHINESS NOTICE

No. 31

Issue 8.

25th September, 1972.

AERONAUTICAL ENGINEERING CERTIFICATES

1 Introduction

1.1 The Aeronautical Engineering Certificate — Part 1 is recognised by the CAA as a qualification in the practical aspects of aeronautical engineering and as one qualification leading to appointment as an inspector. It also fills the need of those persons who have not had the opportunity to acquire the specific type experience required for examination for an Aircraft Maintenance Engineer's Licence.

NOTE : The examination subjects for Part 1 of the examination are given on page 3 of this Notice.

1.2 Holders of Basic and/or Part 1 Aeronautical Engineering Certificates will be granted partial exemption from the appropriate written examination for Aircraft Maintenance Engineers' Licences.

2 Application

2.1 Applications for examination in Part 1 of the Aeronautical Engineering Certificate will be considered from persons employed in the United Kingdom aircraft industry, or persons employed overseas by organisations approved by CAA for maintenance or overhaul of aircraft, who can provide confirmed evidence of three years' recent aeronautical engineering experience, which must be appropriate to the examination subject for which application is made.

2.2 It is recognised that an applicant's experience may simultaneously embrace technologies appropriate to more than one AEC subject. In such cases where a subsequent application is made for a subject which involves a technology closely allied to the subject for which the initial application was made, the experience requirement may be reduced by $1\frac{1}{2}$ years.

2.3 Applications for AEC 11 will be accepted only from persons holding a certificate valid for AEC 8 Instrument Systems.

2.4 Applications for examination from members of HM Forces will be accepted during the last twelve months of their service, provided the experience requirements specified in paragraph 2 are met. Members of HM Forces may, if they so wish, register their intention with the CAA approximately twelve months prior to the proposed examination date. It is understood that this will assist them in obtaining information and training in respect of civil procedures during the remaining period of service. Registration is subject to the submission of an acceptable application, nomination of the required examination date and payment of half the examination fee, which is not refundable. The remainder of the examination fee is payable before the examination date.

3 Procedures

3.1 Only one examination may be taken on one day. An application on Form 370, together with the examination fee of £5·00, must be submitted to the Airworthiness Division, Civil Aviation Authority, Brabazon House, Redhill, Surrey RH1 1SQ, to be received not later than the 15th of the month preceding the month in which examination is required.

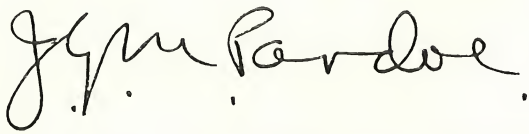
3.2 The examinations are in the form of questions with multiple-choice answers and are held at various centres in the United Kingdom on the last Thursday in the months of January, April, July and October.

3.3 With effect from 28th October, 1972, examinations, including AEC 11, will be conducted in accordance with revised syllabus of examinations dated September, 1972. Copies of the syllabus may be purchased from the Printing and Publications Services, Civil Aviation Authority, Greville House, 37 Gratton Road, Cheltenham, Glos., GL50 2BN, at 50p each post free.

NOTE: Recommended study material is contained in Civil Aircraft Inspection Procedures, which all applicants will need to study. The Printing and Publications Services will also supply details of the method of purchasing Civil Aircraft Inspection Procedures.

3.4 Holders of Basic Aeronautical Engineering Certificates will be issued with the appropriate Part 1 Aeronautical Engineering Certificate without fee, subject to submission of evidence of twelve months' additional experience relevant to the subject since obtaining the Basic Certificate.

4 **Cancellation** This Notice cancels ARB Notice No. 31, Issue 7, dated 2nd August, 1971, which should be destroyed.



for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

APPENDIX A

AERONAUTICAL ENGINEERING CERTIFICATES—PART I

AEC 1 UNPRESSURISED METAL AIRFRAMES

*AEC 2 METAL AIRFRAMES (includes AEC 1 and pressurised airframes)

AEC 3 SUPERCHARGED PISTON ENGINES

AEC 4 JET TURBINE ENGINES

*AEC 5 JET TURBINE AND PROPELLER TURBINE ENGINES (includes AEC 4 and propeller turbine engines)

AEC 6 HELICOPTERS, less engine(s)

AEC 7 INSTRUMENT SYSTEMS EXCLUDING THOSE ASSOCIATED WITH ELECTRONIC APPARATUS

*AEC 8 INSTRUMENT SYSTEMS (includes AEC 7 and instruments associated with electronic apparatus)

AEC 9 D.C. ELECTRICAL SYSTEMS

*AEC 10 D.C. AND A.C. ELECTRICAL SYSTEMS (includes AEC 9 and aircraft main and subsidiary a.c. electrical systems)

I AEC 11 INTEGRATED FLIGHT CONTROL SYSTEMS

AEC 12 AIRBORNE RADIO SYSTEMS, i.e. all systems connected with the transmission and reception of radio signals.

*For examinations marked with an asterisk a partial pass is possible, but only in respect of the subjects covered by the preceding AEC subject number. In such cases re-examination would not involve this subject matter, e.g. a candidate for AEC 5 may obtain a Pass for Jet Turbine Engines, but it is not possible to obtain a Pass for Propeller Turbine Engines only.

AIRWORTHINESS NOTICE

No. 3

Issue 3.

20th July, 1972.

LICENSED AIRCRAFT ENGINEERS AND MEMBERS OF APPROVED INSPECTION ORGANISATIONS—CERTIFICATION RESPONSIBILITIES IN RELATION TO ARTICLES 9, 10 AND 11 OF THE AIR NAVIGATION ORDER.

1 General

1.1 The certificate referred to in Article 9 of the Air Navigation Order is a certificate of maintenance to be issued after inspection in accordance with the approved maintenance schedule.

The certificate referred to in Article 10 of the Air Navigation Order is a certificate of release to be issued after maintenance, in accordance with the approved maintenance schedule, of an aircraft certificated in the General Purpose Category.

The certificate referred to in Article 11 of the Air Navigation Order is a certificate of compliance to be issued after mandatory inspections (other than those required by the approved maintenance schedule), overhaul, repair, replacement, and modifications. Persons authorised to issue these certificates are specified in the appropriate Article of Air Navigation Order.

1.2 The form of certificate of maintenance is prescribed in Section A, Chapter A6-4 of the British Civil Airworthiness Requirements (BCAR) and the certifications required for maintenance are specified in the Approval documents relating to the maintenance schedule.

1.3 The form of certificate of release is prescribed in BCAR Chapter A6-4, and the certifications required for maintenance of aircraft certificated in the General Purpose Category are prescribed in the appropriate general purpose maintenance schedule.

1.4 The form of the certificate of compliance is specified in BCAR Section A, Chapter A4—3. Where issue of a certificate of compliance is required in accordance with BCAR Section A, Chapter A8—1, A8—2 or A8—3, in respect of overhaul, repair, replacement, modification, or inspection, the associated Approved Certificate may be accepted by the recipient as confirmation that this requirement has been met.

1.5 In connection with the certification of work :—

1.5.1 When the work involves a control system to which BCAR Chapter A5—3 applies, any duplicate inspection required must be certified before the relevant certificate of compliance is issued.

1.5.2 **Overhaul.** An overhaul is a major work operation which involves dismantling, bench testing and renewal of operational life. Servicing of items such as piston engine sparking plugs is not considered to constitute overhaul; neither is 'top overhaul' of a piston engine. The complete work concerned with renewal of a Certificate of Airworthiness does not necessarily constitute overhaul and each work operation must be considered individually. Whenever doubt exists reference should be made to the CAA.

1.5.3 **Modification.** Modifications are changes made to a particular aircraft including its components, engines, propellers, radio station, accessories, instruments, equipment, and their installation. For details of the approval and control of modifications reference should be made to BCAR Chapter A4-1.

1.5.4 **Replacement.** A replacement is a work operation which involves the removal and replacement of the same part or the substitution of another similar part. The opening and closing of inspection covers, access hatches, exits, cowlings, etc., is not considered to constitute replacement.

1.5.5 **Repair.** A repair is any work relating to rectification which does not come under one of the above headings.

1.5.6 **Inspection.** The physical act of inspecting is part of any work which constitutes overhaul, modification, replacement or repair and such inspection is covered by the certification required for the work. Where the work is the inspection itself, such inspections requiring certification are indicated by the CAA. These include inspections summarised in the CAA publication 'Mandatory Aircraft Modifications and Inspections Summary'.

1.6 Although many terms in common usage describe the various aspects of aircraft engineering, the meanings assigned to such terms are not always the same. For the purpose of this Notice, in relation to the maintenance of airworthiness, all aspects of the matter are considered to be covered by the following terms :—

(a) **Condition**—the physical state of an item.

(b) **Assembly**—that items are put together, fitted assembled, attached, installed, connected, secured or adjusted correctly in the approved manner.

(c) **Functioning**—correct operation in the approved manner.

1.7 Whenever work is carried out on an aircraft, it is the duty of all persons to whom this Notice No. 3 applies to consider the effect such work may have, directly or indirectly on items which are the responsibility of other such persons. In all cases where an overlap of responsibility occurs, the person primarily responsible for the item must call in other appropriately responsible person(s); to be able to do this, every person to whom this Notice applies must be conversant with all relevant paragraphs of this Notice since certificates of compliance must be issued by all persons concerned, each assuming responsibility for those aspects of the matter for which he is entitled to assume responsibility.

1.8 The conditions for the issue of certificates of compliance within an organisation approved by the CAA are specified in the organisation's procedural instructions.

1.9 Subject to the rating of the category of licence held, the responsibilities of licensed aircraft engineers in connection with certificates of compliance are specified in the relevant paragraphs of this Notice No. 3.

2 Aircraft Maintenance Engineers—Category "A"—Aeroplanes

NOTE : This paragraph must be read in conjunction with paragraph 1 of this Notice No. 3 and particular attention must be paid to paragraph 1.7 which is concerned with overlap of responsibility.

2.1 In connection with inspections, modifications, repairs, and replacements, the engineer licensed in Category "A" is responsible for :—

(a) **Condition**
(b) **Assembly**
(c) **Functioning**

} of all parts of the aeroplane other than those shown in this Notice to be the responsibility of engineers licensed in other categories.

2.2 An engineer licensed in Category "A" is responsible in conjunction with other licensed engineers where stated in this Notice No. 3.

2.3 An engineer licensed in Category "A" may issue certificates of compliance relating to inspection, modification, repair

and replacement of parts of the aeroplane for which he is responsible, provided that the work has not involved any of the following :—

(a) Bolted joints requiring special techniques.

(b) Complete riveted joints in structures.

(c) Complete glued joints in structures.

(d) Reduxed and other bonded joints in structures.

(e) Welded and brazed joints.

(f) Fabric covering of a complete fuselage or aerofoil.

(g) The disturbing of individual parts of units which are supplied as bench tested units, except for the replacement or adjustment of items normally replaceable or adjustable in service where subsequent functioning may be proved without the use of test apparatus additional to the test apparatus used for normal functioning checks.

2.4 An engineer licensed in Category "A", holding a licence valid for any of the types of aeroplane specified in paragraphs 5.1, 5.2, 5.3 and 5.4 of Airworthiness Notices No. 10, is authorised to issue certificates of compliance in relation to aeroplanes the maximum total weight authorised of which does not exceed 2730 kg, in respect of which a Certificate of Airworthiness in the Special Category is in force, and which require certification in accordance with the Air Navigation Order.

2.5 An engineer licensed in Category "A" is entitled to assume certain privileges of a Category "X" licence. The limitations in respect of these privileges are detailed in 2.5.1 to 2.5.4 inclusive.

2.5.1 Certificates of compliance may be issued in accordance with paragraph 8 of this Notice No. 3 for instrument systems in the aeroplane (excluding instrument systems associated with the engine(s), auxiliary power-unit(s), or other propulsive devices), except that,

(a) In the case of aeroplanes indicated thus † in paragraph 5 of Airworthiness Notice No. 10, certificates of compliance may be issued relating to replacements only, provided that functioning checks to prove serviceability do not require the use of test apparatus, and

(b) In the case of aeroplanes indicated thus †† in paragraph 5 of Airworthiness Notice No. 10, certificates of compliance may not be issued.

2.5.2 Certificates of compliance may be issued in accordance with paragraph 9 of this Notice No. 3 for electrical systems in the aeroplane (excluding electrical systems associated with the engine(s), auxiliary power-unit(s), or other propulsive devices), except that,

(a) In the case of aeroplanes indicated thus † in paragraph 5 of Airworthiness Notice No. 10, certificates of compliance may be issued relating to replacements only, provided that functioning checks to prove serviceability do not require the use of test apparatus, and

(b) In the case of aeroplanes indicated thus †† in paragraph 5 of Airworthiness Notice No. 10, certificates of compliance may not be issued.

2.5.3 Certificates of compliance may be issued in accordance with paragraph 10 of this Notice No. 3 for automatic-pilots in the aeroplane, except that,

(a) In the case of automatic-pilots indicated thus † in paragraph 13 of Airworthiness Notice No. 10, certificates of compliance may be issued relating to replacements only, provided that functioning checks to prove serviceability do not require the use of test apparatus, and

(b) In the case of automatic-pilots indicated thus †† in paragraph 13 of Airworthiness Notice No. 10, and automatic-pilots installed in aircraft specified in paragraph 10 of Airworthiness Notice No. 10, certificates of compliance may not be issued.

2.5.4 Certificates of compliance may not be issued for compasses.

3 Aircraft Maintenance Engineers—Category "B"—Aircraft Including Rotorcraft

NOTE : This paragraph must be read in conjunction with paragraph 1 of this Notice No. 3 and particular attention must be paid to paragraph 1.7 which is concerned with overlap of responsibility.

3.1 Category "B"—Aeroplanes

3.1.1 An engineer licensed in Category "B" may issue certificates of compliance relating to all aspects of inspection, overhaul, modification, repair and replacement of components and parts for which he is shown to be responsible in paragraph 2.1 of this Notice No. 3 as an engineer licensed in Category "A", provided that the work does not involve the making of components or parts.

3.1.2 An engineer licensed in Category "B" may also issue certificates of compliance relating to all aspects of inspection, overhaul, modification, repair and replacement relating to items listed in paragraphs (a) to (e) inclusive, provided that the work does not involve the making of components or parts.

(a) Engine mounting structures and cowling.

(b) Engine controls
(c) Engine fuel, oil and coolant systems
(d) Engine fire extinguishing systems
(e) Engine fluid de-icing systems

} except for those parts which form part of or are attached to the engine.

3.2 **Category "B"—Rotorcraft**

3.2.1 An engineer licensed in Category "B" is entitled to extend the responsibilities he assumes as an engineer licensed in Categories "A" and "C", as follows :—

(a) Certificates of compliance may be issued relating to all aspects of inspection, overhaul, modification, repair and replacement of components and parts for which he is shown to be responsible in paragraph 6.1 of this Notice No. 3 (excluding main rotor blades, engines, propellers and propeller controllers) provided that the work does not involve the making of components or parts.

4 Aircraft Maintenance Engineers—Category "C"—Engines

NOTES : (1) This paragraph must be read in conjunction with paragraph 1 of this Notice No. 3 and particular attention must be paid to paragraph 1.7 which is concerned with overlap of responsibility.
(2) For the purposes of certification and licensing auxiliary power-units are considered to be engines.
(3) Engineers requiring the issue or extension of a licence in Category "C" for an engine in an airframe which has an auxiliary power-unit installed will be required to meet all the relevant requirements of BCAR Section L with regard to the auxiliary power-unit at the time of qualifying for the engine type.

4.1 In connection with inspections, modifications, repairs and replacements, an engineer licensed in Category "C" is responsible for :—

(a) **Condition**
(b) **Assembly**
(c) **Functioning**

} of the engine installation, auxiliary power-unit(s), or other propulsive devices, and all associated systems and devices which are concerned with their operation, other than those shown in this Notice No. 3 to be the responsibility of engineers licensed in Category "X".

4.2 An engineer licensed in Category "C" is responsible, in conjunction with other licensed engineers, for devices related to, but not concerned with, the operation of the engine(s), the auxiliary power-unit(s), or other propulsive devices.

4.3 An engineer licensed in Category "C" may issue certificates of compliance relating to inspection, modification, repair and replacement of components and parts for which he is responsible, provided that the work has not involved any of the following :—

(a) Dismantling of a piston engine other than to obtain access to the pistons.

(b) Dismantling of main casings and rotating assemblies of a turbine engine. However, in the case of engines indicated thus ◕ in paragraph 6 of Airworthiness Notice No. 10, dismantling of main casings is permitted, and in the case of engines indicated thus △ in paragraph 6 of Airworthiness Notice No. 10, dismantling of main casings and the replacement of the rotating parts (provided they are replaced as modules) is permitted.

NOTE : The accuracy of the records of overhaul, retirement, or ultimate (scrap) lives of parts (see Airworthiness Notice No. 44) must be ensured by properly recording all work carried out.

(c) The removal or dismantling of reduction gears, except that, in the case of engines indicated thus * in paragraph 6 of Airworthiness Notice No. 10, reduction gears may be removed for the purpose of carrying out inspections after suspected shock loadings.

(d) Propeller balancing.

(e) Welded or brazed joints.

(f) The disturbing of individual parts of units which are supplied as bench tested units, except for the replacement or adjustment of items normally replaceable or adjustable in service where subsequent functioning may be proved without the use of test apparatus additional to the test apparatus used for normal functioning checks.

4.4 An engineer licensed in Category "C", holding a licence valid for any of the types of engine specified in paragraphs 6.1, 6.2 and 6.3 of Airworthiness Notice No. 10, is authorised to issue certificates of compliance in relation to all types of piston engines installed in aeroplanes the maximum total weight authorised of which does not exceed 2730 kg, in respect of which a Certificate of Airworthiness in the Special Category is in force, and which require certification in accordance with the Air Navigation Order.

4.5 An engineer licenced in Category "C" holding a licence valid for any of the types of engine specified in paragraphs 6.4, 6.5, 6.6 and 6.7 of Airworthiness Notice No. 10, is authorised to issue certificates of compliance in relation to all types of jet-turbine engines installed in aeroplanes the maximum total weight authorised of which does not exceed 2730 kg, in respect of which a Certificate of Airworthiness in the Special Category is in force, and which require certification in accordance with the Air Navigation Order.

4.6 An engineer licensed in Category "C" is entitled to assume certain privileges of a Category "X" licence. The limitations in respect of these privileges are as detailed in 4.6.1 and 4.6.2.

4.6.1 Certificates of compliance may be issued in accordance with paragraph 8 of this Notice No. 3 for instrument systems associated with the engine(s), auxiliary power-unit(s), or other propulsive devices, except that,

(a) In the case of engine(s), auxiliary power-unit(s), or other propulsive devices installed in aeroplanes indicated thus † in paragraph 5 of Airworthiness Notice No. 10, certificates of compliance may be issued relating to replacements only, provided that functioning checks to prove serviceability do not require the use of test apparatus, and

(b) In the case of engine(s), auxiliary power-unit(s), or other propulsive devices installed in aeroplanes indicated thus †† in paragraph 5 of Airworthiness Notice No. 10 certificates of compliance may not be issued.

4.6.2 Certificates of compliance may be issued in accordance with paragraph 9 of this Notice No. 3 for electrical systems associated with the engine(s), auxiliary power-unit(s), or other propulsive devices, except that,

(a) In the case of engine(s), auxiliary power-unit(s), or other propulsive devices, installed in aeroplanes indicated thus † in paragraph 5 of Airworthiness Notice No. 10, certificates of compliance may be issued relating to replacements only, provided that functioning checks to prove serviceability do not require the use of test apparatus, and

(b) In the case of engine(s), auxiliary power-unit(s), or other propulsive devices installed in aeroplanes indicated thus †† in paragraph 5 of Airworthiness Notice No. 10 certificates of compliance may not be issued.

5 Aircraft Maintenance Engineers—Category "D"—Engines

NOTE : This paragraph must be read in conjunction with paragraph 1 of this Notice No. 3 and particular attention must be paid to paragraph 1.7 which is concerned with overlap of responsibility.

5.1 In connection with inspections, overhauls, modifications, repairs and replacements, an engineer licensed in Category "D" is responsible for :—

(a) **Condition**
(b) **Assembly**
(c) **Functioning** insofar as test bed performance is concerned

} of the engine only.

(d) **Functioning** insofar as an installed engine is concerned

} in conjunction with an engineer licensed in Category "C".

5.2 An engineer licensed in Category "D" may issue certificates of compliance relating to all aspects of inspection, overhaul, modification, repair and replacement of components and parts of the engine only (excluding inspection, overhaul, modification and repair of ignition apparatus, instrument equipment and electrical equipment) provided that the work does not involve the making of components or parts.

6 Aircraft Maintenance Engineers—Categories "A" and "C"—Rotorcraft

NOTE : This paragraph must be read in conjunction with paragraph 1 of this Notice No. 3 and particular attention must be paid to paragraph 1.7 which is concerned with overlap of responsibility.

6.1 In connection with inspections, modifications, repairs and replacements, an engineer licensed in Categories "A" and "C"—Rotorcraft is responsible for :—

(a) **Condition**
(b) **Assembly**
(c) **Functioning**

} of all parts of the rotorcraft other than those shown in this Notice No. 3 to be the responsibility of engineers licensed in other categories.

6.2 An engineer licensed in Categories "A" and "C"—Rotorcraft is responsible in conjunction with other licensed engineers where stated in this Notice No. 3.

6.3 An engineer licensed in Categories "A" and "C"—Rotorcraft may issue certificates of compliance relating to inspection, modification, repair and replacement of parts of the rotorcraft for which he is responsible, provided that the work has not involved any of the following :—

(a) Bolted joints requiring special techniques.

(b) Complete riveted joints in structures.

(c) Complete glued joints in structures.

(d) Reduxed and other bonded joints in structures.

(e) Welded and brazed joints.

(f) Fabric covering of a complete fuselage or aerofoil.

(g) Dismantling of a piston engine other than to obtain access to the pistons.

(h) Dismantling of main casings and rotating assemblies of a turbine engine. However, in the case of engines indicated thus ◕ in paragraph 7 of Airworthiness Notice No. 10, dismantling of main casings is permitted, and in the case of engine(s) indicated thus △ in paragraph 7 of Airworthiness Notice No. 10, the replacement of the rotating parts (provided they are replaced as modules) and dismantling of the main casings are permitted.

NOTE : The accuracy of the records of overhaul, retirement, or ultimate (scrap) lives of parts (see Airworthiness Notice No. 44) must be ensured by properly recording all work carried out.

(j) Dismantling of transmission gearbox casings other than to obtain access for internal inspection.

(k) Propeller balancing.

(l) The disturbing of individual parts of units which are supplied as bench tested units or of major components of transmission systems, except for the replacement or adjustment of items normally replaceable or adjustable in service where subsequent functioning may be proved without the use of test apparatus additional to the test apparatus used for normal functioning checks.

6.4 An engineer licensed in Categories "A" and "C"—Rotorcraft, holding a licence valid for any of the types of rotorcraft specified in paragraphs 7.1 and 7.2 of Airworthiness Notice No. 10, is authorised to issue certificates of compliance in relation to rotorcraft with piston engines the maximum total weight authorised of which does not exceed 2730 kg, and in respect of which a Certificate of Airworthiness in the Special Category is in force, and which require certification in accordance with the Air Navigation Order.

6.5 An engineer licensed in Categories "A" and "C"—Rotorcraft, holding a licence valid for any of the types of rotorcraft specified in paragraphs 7.3, 7.4 and 7.5 of Airworthiness Notice No. 10, is authorised to issue certificates of

compliance in relation to rotorcraft with jet-turbine engines the maximum total weight authorised of which does not exceed 2730 kg, in respect of which a Certificate of Airworthiness in the Special Category is in force, and which require certification in accordance with the Air Navigation Order.

6.6 An engineer licensed in Categories "A" and "C" is entitled to assume certain privileges of a Category "X" licence. The limitations in respect of these privileges are as detailed in 6.6.1 to 6.6.4 inclusive.

6.6.1 Certificates of compliance may be issued in accordance with paragraph 8 of this Notice No. 3 for instrument systems in the rotorcraft, except that,

(a) In the case of rotorcraft indicated thus † in paragraph 7 of Airworthiness Notice No. 10, certificates of compliance may be issued relating to replacements only, provided that functioning checks to prove serviceability do not require the use of test apparatus, and

(b) In the case of rotorcraft indicated thus †† in paragraph 7 of Airworthiness Notice No. 10, certificates of compliance may not be issued.

6.6.2 Certificates of compliance may be issued in accordance with paragraph 9 of this Notice No. 3 for electrical systems in the rotorcraft, except that,

(a) In the case of rotorcraft indicated thus † in paragraph 7 of Airworthiness Notice No. 10, certificates of compliance may be issued relating to replacements only, provided that functioning checks to prove serviceability do not require the use of test apparatus, and

(b) In the case of rotorcraft indicated thus †† in paragraph 7 of Airworthiness Notice No. 10, certificates of compliance may not be issued.

6.6.3 Certificates of compliance may be issued in accordance with paragraph 10 of this Notice No. 3 for automatic-pilots in rotorcraft, except that,

(a) In the case of automatic-pilots indicated thus † in paragraph 13 of Airworthiness Notice No. 10, certificates of compliance may be issued relating to replacements only, provided that functioning checks to prove serviceability do not require the use of test apparatus, and

(b) In the case of automatic-pilots indicated thus †† in paragraph 13 of Airworthiness Notice No. 10, certificates of compliance may not be issued.

6.6.4 Certificates of compliance may not be issued for compasses.

7 Aircraft Maintenance Engineers—Category "X"—Compasses

NOTE : This paragraph must be read in conjunction with paragraph 1 of this Notice No. 3 and particular attention must be paid to paragraph 1.7 which is concerned with overlap of responsibility.

7.1 In connection with inspections, modifications, repairs and replacements, an engineer licensed in Category "X"—Compasses, is responsible for :—

(a) **Condition** . . . . of all parts of the compass.

(b) **Assembly** (except as specified below) } of all component parts of the compass.

Assembly insofar as aircraft main electrical power supply (if any) is concerned } in conjunction with an engineer licensed in Category "X"—Electrical.

Assembly insofar as connection to other systems is concerned } in conjunction with the licensed engineer responsible for the system concerned.

(c) **Functioning** (except as specified below) } of all parts of the compass.

Functioning insofar as effect on other systems is concerned } in conjunction with the licensed engineer responsible for the system concerned.

7.2 An engineer licensed in Category "X"—Compasses, may issue certificates of compliance relating to inspection, modification, repair and replacement of components and parts for which he is responsible, provided that units which are supplied as bench tested units may not have their individual parts disturbed, except for the replacement or adjustment of items normally replaceable or adjustable in service, and that functioning checks to prove serviceability do not require the use of test apparatus other than that used for normal functioning checks.

8 Aircraft Maintenance Engineers—Category "X"—Instruments

NOTE : This paragraph must be read in conjunction with paragraph 1 of this Notice No. 3 and particular attention must be paid to paragraph 1.7 which is concerned with overlap of responsibility.

8.1 In connection with inspections, modifications, repairs and replacements, an engineer licensed in Category "X"—Instruments, is responsible for :—

(a)	**Condition**	of all parts of the instrument systems.
(b)	**Assembly** (except as specified below)	of all component parts of the instrument systems.
	Assembly insofar as aircraft main electrical power supply (if any) is concerned	in conjunction with an engineer licensed in Category "X"—Electrical.
	Assembly insofar as connection to mechanical drives or to other systems is concerned	in conjunction with the licensed engineer responsible for the system concerned.
(c)	**Functioning** (except as specified below)	of all parts of the instrument systems.
	Functioning insofar as effect on other systems is concerned	in conjunction with the licensed engineer responsible for the system concerned.

8.2 An engineer licensed in Category "X"—Instruments, may issue certificates of compliance relating to inspection, modification, repair and replacement of components and parts for which he is responsible, provided that units which are supplied as bench tested units may not have their individual parts disturbed, except for the replacement or adjustment of items normally replaceable or adjustable in service, and that functioning checks to prove serviceability do not require the use of test apparatus other than that used for normal functioning checks.

9 Aircraft Maintenance Engineers—Category "X"—Electrical

NOTE : This paragraph must be read in conjunction with paragraph 1 of this Notice No. 3 and particular attention must be paid to paragraph 1.7 which is concerned with overlap of responsibility.

9.1 In connection with inspections, modifications, repairs and replacements, an engineer licensed in Category "X"—Electrical, is responsible for :—

(a)	**Condition**	of all parts of the electrical systems.
(b)	**Assembly** (except as specified below)	of all component parts of the electrical systems.

Assembly insofar as connection to mechanical drives or to other systems is concerned	in conjunction with the licensed engineer responsible for the system concerned.

(c) **Functioning** (except as specified below) — of all parts of the electrical systems.

Functioning insofar as effect on other systems is concerned	in conjunction with the licensed engineer responsible for the system concerned.

9.2 An engineer licensed in Category "X"—Electrical, may issue certificates of compliance relating to inspection, modification, repair and replacement of components and parts for which he is responsible, provided that units which are supplied as bench tested units may not have their individual parts disturbed, except for the replacement or adjustment of items normally replaceable or adjustable in service, and that functioning checks to prove serviceability do not require the use of test apparatus other than that used for normal functioning checks.

10 Aircraft Maintenance Engineers—Category "X"—Automatic-pilots (Automatic-stabilizers)

NOTES : (1) This paragraph must be read in conjunction with paragraph 1 of this Notice No. 3 and particular attention must be paid to paragraph 1.7 which is concerned with overlap of responsibility.
(2) For the purposes of licensing automatic-stabilizers are deemed to be automatic-pilots.
(3) Automatic-pilots include related systems such as yaw and/or roll dampers and Mach trim devices.

10.1 In connection with inspections, modifications, repairs and replacements, an engineer licensed in Category "X"—Automatic-pilots, is responsible for :—

(a) **Condition** . . . . — of all parts of the automatic-pilot.

(b) **Assembly** (except as specified below) — of all component parts of the automatic-pilot.

Assembly insofar as aircraft main electrical power supply (if any) is concerned	in conjunction with an engineer licensed in Category "X"—Electrical.
Assembly insofar as connection to a control system or to other systems is concerned	in conjunction with the licensed engineer responsible for the system concerned.

(c) **Functioning** (except as specified below) } of all parts of the atuomatic-pilot.

Functioning insofar as effect on other systems is concerned } in conjunction with the licensed engineer responsible for the system concerned.

10.2 An engineer licensed in Category "X"—Automatic-pilots, may issue certificates of compliance relating to inspection, modification, repair and replacement of components and parts for which he is responsible, provided that units which are supplied as bench tested units may not have their individual parts disturbed, except for the replacement or adjustment of items normally replaceable or adjustable in service, and that functioning checks to prove serviceability do not require the use of test apparatus other than that used for normal functioning checks.

11 Aircraft Maintenance Engineers—Multi-Category "X"

In the case of an engineer who holds a Multi-Category "X" licence, the provisions of paragraphs 7, 8 and 10 of this Notice No. 3 apply, unless, in the case of a Multi-Category "X" licence which covers compasses, the authority to certify work which involves the swinging and/or adjustment and compensation of the compasses is specifically excluded in the licence.

12 Aircraft Maintenance Engineers—Category "R"—Radio

NOTE : This paragraph must be read in conjunction with paragraph 1 of this Notice No. 3 and particular attention must be paid to paragraph 1.7 which is concerned with overlap of responsibility.

12.1 In connection with inspections, modifications, repairs and replacements, an engineer licensed in Category "R"—Radio, is responsible for :—

(a) **Condition** . . . . } of all parts of the aircraft radio installation including associated cables and accessories.

(b) **Assembly** (except as specified below) } of all component parts of the aircraft radio installations.

Assembly insofar as aircraft main electrical power supply is concerned } in conjunction with an engineer licensed in Category "X"—Electrical.

Assembly insofar as input of radio signals into other systems is concerned } in conjunction with the licensed engineer responsible for the system concerned.

Assembly insofar as attachment to the aircraft structure is concerned } in conjunction with an engineer licensed in Category "A".

(c) **Functioning** (except as specified below) } of all parts of the aircraft radio installation.

Functioning insofar as effect on other systems is concerned } in conjunction with the licensed engineer responsible for the system.

12.2 An engineer licensed in Category "R"—Radio, may issue certificates of compliance relating to inspection, modification, repair and replacement of components and parts for which he is responsible, provided that units which are supplied as bench tested units may not have their individual parts disturbed, except for the replacement or adjustment of items normally replaceable or adjustable in service, and that functioning checks to prove serviceability do not require the use of test apparatus other than that used for normal functioning checks.

12.3 An engineer licensed in Category "R"—Radio, endorsed to include the inspections, overhauls, modifications, repairs and replacements of radio apparatus, is responsible for :—

(a) **Condition**
(b) **Assembly**
(c) **Functioning**

} of aircraft radio apparatus undergoing periodic check, repair or overhaul in workshops.

12.4 An engineer licensed in accordance with the foregoing paragraph 12.3 may issue certificates of compliance relating to inspections, overhauls, modifications, repairs and replacements of components and parts of all aircraft radio apparatus for which he is responsible, provided that the work done does not involve the making of radio components or parts.

13 **Cancellation** This Notice cancels ARB Notice No. 3, Issue 2, dated 1st May, 1970, which should be destroyed.

for the Civil Aviation Authority

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

AIRWORTHINESS NOTICE

No. 12

Issue 10.

8th October, 1974.

EXPERIENCE FROM INCIDENTS

1.1 From time to time incidents occur, usually in aircraft operations, which, in the opinion of the CAA, reflect the need for a general awareness of possible hazard resulting from practices which may have a wide general application. The purpose of this Notice is to advise all concerned, particularly design and engineering staff engaged in aircraft construction or operation, of such incidents from UK experience which have come to the notice of the CAA, and where necessary to prescribe action to be taken.

1.2 New incidents will be advised in Appendices to this Notice, and the List of Appendices will be up-dated with each such issue. For the purpose of the new scheme, Appendices covering incidents already included in Issue 5 of this Notice are dated 1st March, 1973.

LIST OF APPENDICES

App.	*Subject*	*Issue*	*Date*
1	Soft Metal Shims	1	1.3.73
2	Crowded Ball Races	1	1.3.73
3	Oxygen Fire Risk	1	1.3.73
4	Flutter of Flying Control Surfaces	1	1.3.73
5	Fluids Used in Aircraft	1	1.3.73
6	Inspection in Relation to Spillage or Collection of Fluid	2	5.10.73
7	Foreign Objects—Danger of Jamming	2	22.8.74
I 8	Brake and Anti-Skid Systems	2	8.10.74
9	Auto-pilots on Light Aircraft	1	5.10.73
10	Inspection of Critical Parts of Helicopter Gearboxes	1	7.11.73
11	Unauthorised Alteration of Parts	1	7.11.73
12	Maintenance of Radio Navigation Equipment Course and Alarm Signal Current Limits	2	22.8.74

2 **Cancellation** This Issue of Airworthiness Notice No. 12 cancels pages 1/2 and 7/8 of Airworthiness Notice No. 12, Issue 9, dated 22nd August, 1974, which pages should now be destroyed and replaced by the new pages 1/2 and 7/8.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

before the area is cleaned. Accidental fluid spillage which is known to have occurred during flight should be recorded in the technical log, and particular attention should be paid to the regions below the floor when inspecting for the effects of such spillage.

3 Cleanliness of the aircraft internal structure is also important because dirt and dust may act as a sponge and retain fluids, thus increasing the risk of corrosion.

4 To prevent corrosion, it is essential to ensure the proper functioning of drains and drain holes. Inspectors should be aware of all the drainage means in the areas for which they are responsible and should check that these are free from obstruction.

AIRWORTHINESS NOTICE No. 12 APPENDIX No. 7

Issue 2.

22*nd August*, 1974.

Foreign Objects — Danger of Jamming

1 'Foreign objects' continue to be one of the major hazards to aircraft control systems. Recent instances include (a) a bolt lodged between a flying control hydraulic-booster jack and its chassis, (b) hydraulic fluid top-up cans and meal trays fouling primary control cable runs, (c) a sheared-off nut and stud which caused jamming of an elevator pulley assembly, (d) a "spare" control rod left in the base of a fin by the constructor, which caused intermittent jamming of rudder, and was not found during twelve months of operation, (e) a 2BA nut left on a control chain which caused failure of the chain as a result of the action of sprocket teeth, and resulted in jamming of one flap surface, (f) a double-ended ring spanner which remained undiscovered for $2\frac{1}{2}$ years in a wing bay which had been opened several times during this period for control system inspection.

2 Whilst it is possible by good design to reduce the risk of entrapment of 'foreign objects', maintenance personnel are reminded that, during and after any work on an aircraft, it is essential that all 'foreign objects' should be removed. Personnel must carry out careful checks to ensure freedom from 'foreign objects', particularly when they have been working in the vicinity of flying control systems. Personnel should neither be content to leave missing old or new parts, or tools, unaccounted for, nor fail to check that an area they inspect is free from foreign objects, even though the nature of the most recent work would not introduce any. Attention is also drawn to the precautionary measures detailed in CAIP Leaflet BL/6-19.

Brake and Anti-Skid Systems

1 Instances have occurred in which wheel brake systems incorporating anti-skid protection have not functioned in a fully effective manner. Subsequently, in most instances, a fault has been discovered in the braking system which has prevented the brakes from operating efficiently on all wheels. Loss of efficiency can result from a variety of causes, e.g. incorrect assembly or failure of components, in either an electrical or hydro/mechanical anti-skid system. In one instance a cross connection of units in combination with a dormant fault contributed to an accident.

2 Experience has shown that dormant faults, which reduce the maximum energy absorption capability of the brakes, can exist without being detected during normal energy stops. These only become apparent when the full effectiveness of the brakes is called into use, such as during a rejected take-off. In order, therefore, to guard against such troubles, it will be necessary to institute checks, at agreed periodic intervals and also after any disturbance or replacement of the brake or parts of the anti-skid system, to ensure that :—

(a) the operation of each anti-skid sensor controls the brake on the wheel with which it is associated, and
(b) the operation of the whole braking system, including any anti-skid facility, is normal and satisfactory.

3 If functional checks carried out in accordance with the relevant Maintenance Manuals would not achieve the objectives stated in 2 (a) and (b), the aircraft constructor should be consulted in order to agree suitable amendments to the Manuals to include tests which will verify the functional integrity of the system.

4 Additionally, Operators having Maintenance Schedules approved by the CAA should review these Schedules, and if necessary forward suitable amendments which will ensure that functional checks prescribed in the Schedule will cover the particular matters stated in 2 (a) and (b), and that any necessary cross references to the Maintenance Manual are amended or added.

5 In the event of difficulty in obtaining agreement with constructors, the Airworthiness Division should be consulted.

Issue 2.

22nd August, 1974.

Maintenance of Radio Navigation Equipment Course and Alarm Signal Current Limits

1 Following an aircraft accident, it is understood that investigation of the ILS Localiser and Glide Path systems revealed that the signal current settings were set too high. This could result both in the course indicator being over-sensitive and in the flag warnings failing to appear in fault conditions.

2 Engineers must ensure that the instructions contained in the relevant maintenance/overhaul manuals are complied with, particularly those applicable to course deviation and alarm current settings.

3 Prior to installation in an aircraft, engineers must ensure that the current settings of units are compatible with the particular aircraft system.

4 Any adjustments found necessary must only be carried out in a workshop where the necessary test equipment and maintenance/overhaul manuals are available and by persons appropriately approved.

5 Most ramp test equipment, whilst capable of checking alarm circuits for some gross failures, is inadequate for checking their operation in other important cases. In particular, it will not reveal whether current settings are such as to prejudice proper flag operation. The CAA is discussing with manufacturers the possibility of modifying such equipment e.g. by making provision for the interruption of the tone sources so as to enable a check of the operation of alarm circuits of the installation to be made, and the outcome of these discussions would be the subject of manufacturers bulletins.

6 It is good practice, which the CAA will expect operators and maintenance organisations to implement, that all units incorporating adjustments for variable loads, whether in aircraft or held as spares, have a label indicating the loads for which the unit has been adjusted fixed in a prominent position on the front of the unit. Aircraft using such units should have a similar label fixed to the unit mounting.

AIRWORTHINESS NOTICE

No. 11

Issue 6.

5th October, 1973.

ACCEPTANCE OF AERONAUTICAL PARTS FROM OTHER THAN CAA APPROVED SOURCES

1 Introduction This Notice gives guidance on the acceptance, for use in aircraft, of Aeronautical Parts (see 2.1.1) supplied from sources other than those directly approved by the CAA.

NOTE: Nothing in this Notice is to be taken as overriding procedures whereby organisations which are approved by the CAA for the design and manufacture of aircraft, engines, or items of equipment, are able to specify and accept parts of foreign design and/or manufacture for incorporation in their own product.

2 General

2.1 **Definitions.*** For the purpose of this Notice the following definitions apply.

2.1.1 **Aeronautical Parts.** Those parts, the failure, or partial failure of which could adversely affect the airworthiness of the aircraft or the safety of the occupants.

2.1.2 **User.** The person or approved organisation responsible for signing the certificate of compliance or log book record, as the case may be, in respect of the parts to which this Notice relates.

2.1.3 **CAA Approved Source.** Any person or organisation appropriately approved by the CAA in accordance with BCAR Sub-section A7 or A8.

2.1.4 **Unapproved Supplier.** Any person or organisation which is not appropriately approved by the CAA in accordance with BCAR Sub-section A7 or A8.

Note: Thus a supplier, stockist, agency, distributor, or any other organisation which is not appropriately approved by the CAA, is classified as an Unapproved Supplier.

2.1.5 **Stockist's Certificate.** A release document issued by the supplying company to the purchaser under the authority of the Company Secretary or a Director. This document certifies that the Aeronautical Parts were obtained from a source covered by the appropriate procedures as defined in paragraphs 3.1.1, 3.2.1, 3.3.1 and 3.4.1, and for identification purposes it must bear the serial number and date of the appropriate verifying document(s) received by the supplier when the Aeronautical Parts were acquired.

* Defined terms are distinguished in the text by initial capital letters, e.g. "Aeronautical Parts".

2.1.6 **Origin.** The organisation at which the Aeronautical Part was last formally certified, not necessarily the company of initial manufacture.

NOTE: Thus an Aeronautical Part of USA manufacture would become of UK Origin if last formally certified by a CAA approved organisation in the UK, and so on.

2.2 **Responsibilities**

2.2.1 Regardless of the source of Aeronautical Parts, the User is reminded that he bears the ultimate responsibility for ensuring that such parts are genuine and in a serviceable condition, and that such parts conform to the correct modification and inspection standards.

2.2.2 It is emphasised that it is the responsibility of the User to define his specific requirements in purchase orders.

3 Use of Aeronautical Parts in UK Registered Aircraft

3.1 **Aeronautical Parts of UK Origin***

3.1.1 It is the responsibility of the User to be satisfied that Aeronautical Parts received from an Unapproved Supplier were obtained from a CAA Approved Source. The established procedure of requesting a Stockist's Certificate is considered a satisfactory method of achieving this end, provided that confidence has been established between the User and the Unapproved Supplier. Where such confidence has not been established, it is recommended that the User should obtain a certified photocopy of the approved certificate, and any associated technical documents, which were supplied with the part to the Unapproved Supplier.

3.1.2 Where the purchase order specifies certification in accordance with CAA Requirements, a certificate issued under any other authority, for example a Release Note issued solely under a Defence Contract, such as 6/49 Conditions, is not acceptable.

NOTE: Airworthiness Notice No. 14 gives guidance on the procedures in relation to Common Aeronautical Supplies, which may be used in both civil and military aircraft.

3.2 **Aeronautical Parts of USA Origin***

3.2.1 It is the responsibility of the User to be satisfied that Aeronautical Parts, whether obtained from an Unapproved Supplier in the UK or USA, or direct from the USA manufacturer, have been subject to the Federal Aviation Administration (FAA) procedures, detailed in FAR Part 21, Sub-part L, except where alternative procedures are agreed by the CAA with individual Users.

* See paragraph 2.1.6

3.2.2 Where Aeronautical Parts are obtained through an Unapproved Supplier, a Stockist's Certificate is considered a satisfactory method of proving Origin, provided that confidence has been established between the User and the Unapproved Supplier. Where such confidence has not been established, it is recommended that the User should obtain a certified photocopy of the original certification documents, and any associated technical documents, which were supplied with the part to the Unapproved Supplier.

NOTE: Special CAA procedures apply for the use of parts manufactured under the FAA Parts Manufacturer Approval (PMA) and, in these instances, the CAA must be contacted for advice.

3.3 Aeronautical Parts of French Origin*

3.3.1 It is the responsibility of the User to be satisfied that Aeronautical Parts, whether obtained from an Unapproved Supplier in the UK or France, or direct from the French manufacturer, have been subject to the procedures of Airworthiness Notice No. 34.

3.3.2 Where Aeronautical Parts are obtained through an Unapproved Supplier in the UK, a Stockist's Certificate is considered a satisfactory method of proving Origin provided that confidence has been established between the User and the Unapproved Supplier. Where such confidence has not been established, it is recommended that the User should obtain a certified photocopy of the Certificat de Contrôle and/or the Certificat de Conformité, and any associated technical documents, which were supplied with the part to the Unapproved Supplier.

3.4 Aeronautical Parts Originating from Foreign Sources other than the USA and France

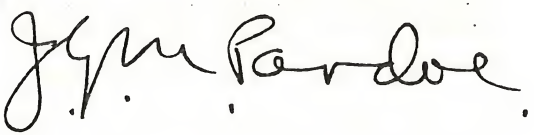
3.4.1 Aeronautical Parts obtained from the manufacturer of foreign built aircraft, engines, or equipment which are already certificated by the CAA, can be accepted by the User provided that the procedures required by the appropriate national authority, and any special procedures or conditions imposed by the CAA, have been complied with.

3.4.2 The use of Aeronautical Parts, other than those described in 3.4.1, is not acceptable on UK registered aircraft, unless the organisation outside the UK from which they are obtained is appropriately approved by the CAA, and such parts are certified under that approval, or their use is specifically authorised by the CAA.

* See paragraph 2.1.6.

3.4.3 Where parts, as described in 3.4.1 and 3.4.2, are obtained through an Unapproved Supplier, it is recommended that the User should obtain a certified photocopy of the certification documents, and any associated technical documents, which were supplied with the part to the Unapproved Supplier.

4 **Cancellation.** This Notice cancels Airworthiness Notice No. 11, Issue 5, dated 1st December, 1972, which should be destroyed.



for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

A. R. B. NOTICE

No. 8

Issue 1.

1*st June*, 1964.

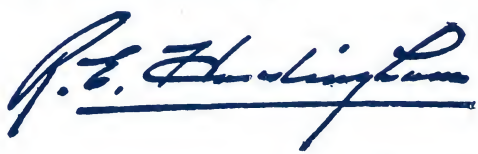
RECTIFICATION OF DEFECTS

1 Recent accident investigation has shown that the procedure for the rectification of defects is not always being followed. In this respect attention is drawn to Chapters A4—3 and A6—8 of British Civil Airworthiness Requirements.

2 In several cases it has been established that defects had been reported many times prior to failure of a component. In some cases no action had been taken and in others attempts at rectification had not been effective.

3 Operators are reminded that a condition of the Board's recommendation to the Director of Aviation Safety that an Air Operator's Certificate should be issued, is that the operator "will at all times conduct his undertaking with due regard to the technical discipline essential to the maintenance of airworthiness". One of his responsibilities is to ensure that provision is made for the effective rectification of defects as they are reported and failure to comply with this requirement could lead to suspension of his Air Operator's Certificate.

By Order of the Board,



Secretary.

Air Registration Board,
Chancery House,
Chancery Lane,
London, W.C.2.

ARB NOTICE

No. 9

Issue 2.

16*th September*, 1968.

AIRCRAFT MAINTENANCE SCHEDULES AND CERTIFICATES OF MAINTENANCE

1 The Air Navigation Order prescribes that certificates of maintenance must be issued at the periods specified in the approved maintenance schedule for the aircraft concerned and that the period of validity of the certificate must be shown on the certificate. The procedure to be followed for obtaining approval of aircraft maintenance schedules is given in Section A of British Civil Airworthiness Requirements.

2 Before issuing a certificate of maintenance, a licensed aircraft engineer should satisfy himself that, on the basis of the information provided by the operator up to the time of issue of the certificate, all maintenance and inspection required to be carried out in accordance with the approved maintenance schedules has been so carried out and that all recorded defects have been rectified and properly certified in accordance with the requirements of Chapter A4—3 of British Civil Airworthiness Requirements.

NOTE: Some operators have an acceptable system for carrying forward defects beyond the maintenance check at which a certificate of maintenance is required to be issued. In these cases such defects are declared as 'carry forward items' by properly authorised company personnel and are recorded for future action. Before issuing a certificate of maintenance the licensed aircraft engineer should satisfy himself that such defects are acceptable for the 'carry forward' action and that they are properly recorded.

3 A certificate of maintenance remains in force during the whole of its period of validity but the rectification of any defect occurring during this period must be certified by the holder of an aircraft maintenance engineer's licence covering the type of aircraft and/or engines or equipment concerned; or by an authorised representative of an inspection organisation

approved for the overhaul, modification and repair of the particular aircraft or equipment. In the latter case, the signatory can only be authorised by means of suitable arrangements between the chief inspectors of the organisations concerned, and the reference number of the approved inspection organisation must be quoted on the certificate of compliance as the authority for the certification.

4 **Cancellation** This Notice cancels ARB Notice No. 9, Issue 1, dated 1st December, 1966, which should be destroyed.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

AIRWORTHINESS NOTICE

No. 2

Issue 18.

1*st February*, 1973.

RENEWAL OF AIRCRAFT MAINTENANCE ENGINEERS' LICENCES

1 With effect from 1st May, 1973, licences will normally be valid for a period of two years, and will be renewed on application provided that, during the 24 months preceding the date of expiry of the licence, the holder has exercised the privileges of the licence or has been engaged, for periods totalling at least six months, on work which can be considered as comparable with the duties and privileges for which the licence is rated. Where these conditions have not been fulfilled the engineer may maintain the validity of his licence by complying with the current requirements for the grant of a licence.

2 A licence which has lapsed for more than two years will not be considered for renewal without examination of the holder. Application should be made in accordance with the current procedure. The extent of the examination will be dependent on the nature of the employment of the holder since the licence expired, and the degree to which such duties could be considered as comparable to those for which the licence is endorsed.

3 The CAA is anxious that there should be close liaison between its Surveyors and Aircraft Engineers, and engineers should, in their own interests, keep in close touch with the CAA Surveyor stationed nearest their place of employment. When changing their place of employment engineers should, if possible, notify the Surveyors at the Office in the area which they are leaving; they should, in any case, notify the Surveyors at the Office nearest their new place of employment. A list of Offices is given overleaf.

NOTE: 'Office' is an office of the CAA Airworthiness Division.

4 Engineers should note that, approximately one month before the expiry date of the licence, the CAA will forward a renewal form (AD 302) to each licence holder at the last private address registered with the CAA. Licences cannot be back-dated and, for a licence to remain in force, application for renewal must be received by the CAA prior to the date of expiry of the licence. Renewal of expired licences can be effected only as from the date of receipt of an acceptable application and fee at CAA Airworthiness Division, Brabazon House. In order to be sure of receiving the renewal form and other communications, engineers should notify changes of private address direct to Brabazon House.

United Kingdom

Civil Aviation Authority, Airworthiness Division,
Brabazon House, Redhill, Surrey. RH1 1SQ.
Tel. Redhill 65966. Telex: 27100

Area Offices:

Civil Aviation Authority, Airworthiness Division,
Glamorgan (Rhoose) Airport, Rhoose, Barry, Glamorgan.
Tel. Rhoose 687.

Civil Aviation Authority, Airworthiness Division,
c/o Short Brothers & Harland Ltd., Queens Island,
Belfast, N. Ireland.
Tel. Belfast 58444, Ext. 242.

Civil Aviation Authority, Airworthiness Division,
c/o British Aircraft Corporation Ltd.,
Commercial Aircraft Division, Filton House, Bristol.
BS99 7AR.
Tel. Bristol 695321.

Civil Aviation Authority, Airworthiness Division,
Coventry Civic Airport, Baginton, Coventry. CV8 3AZ.
Tel. Coventry 301903.

Civil Aviation Authority, Airworthiness Division,
East Midlands Airport,
Castle Donington, Derby. DE7 2SA.
Tel. Derby 811245, Ext. 279.

Civil Aviation Authority, Airworthiness Division,
34 Imperial Square,
Cheltenham, Glos. GL50 1Q7.
Tel. Cheltenham 35302.

Civil Aviation Authority, Airworthiness Division,
c/o British Aircraft Corporation Ltd.,
Commercial Aircraft Division, Bournemouth
(Hurn) Airport, Christchurch, Hants.
Tel. Northbourne 5821.

Civil Aviation Authority, Airworthiness Division,
1st Floor, Silver House, Silver Street, Doncaster. DN1 1HL.
Tel. Doncaster 69441.

Civil Aviation Authority, Airworthiness Division,
Hatfield Aerodrome, Hatfield, Herts.
Tel. Hatfield 62345, Ext. 241.

Civil Aviation Authority, Airworthiness Division,
Room 43, Building 99,
Gatwick Airport South, Horley, Surrey.
Tel. Crawley 27276.

Civil Aviation Authority, Airworthiness Division,
Heathrow Airport — London, Hounslow, Middlesex.
BOAC Office: Building 209, Epsom Square. Tel. 01-759 1992.
BEA Office: Engineering Base, Viscount Way. Tel. 01-759 3131, Ext. 4283 & 4406.

Civil Aviation Authority, Airworthiness Division,
Office No. 14, Control Tower Area,
Luton Airport, Luton, Beds.
Tel. Luton 29424.

Civil Aviation Authority, Airworthiness Division,
Building 205, Manchester Airport,
Wythenshawe, Manchester, M22 5PA.
Tel. 061-437-8131.

Civil Aviation Authority, Airworthiness Division,
Perth Aerodrome, Perth, Scotland. PH2 6NW.
Tel. Scone 51068.

Civil Aviation Authority, Airworthiness Division,
28a Bedford Place, Southampton, Hants. S01 2DB.
Tel. Southampton 21058 and 26830.

Civil Aviation Authority, Airworthiness Division,
Municipal Airport, Southend-on-Sea, Essex. SS2 6YJ.
Tel. Southend-on-Sea 544044.

Civil Aviation Authority, Airworthiness Division,
Room 110, Building 130,
Stansted Airport, Stansted, Essex.
Tel. Bishops Stortford 502518.

Civil Aviation Authority, Airworthiness Division,
c/o British Aircraft Corporation Ltd.,
Commercial Aircraft Division, Weybridge Works,
Weybridge, Surrey.
Tel. Weybridge 48238.

Civil Aviation Authority, Airworthiness Division,
Building 155, Oxford Airport,
Kidlington, Oxfordshire. OX5 1RA.
Tel. Kidlington 5885.

Overseas

Civil Aviation Authority, Airworthiness Division,
c/o Department of Civil Aviation,
P.O. Box 975, Nassau, Bahamas.
Cable Address. Bordair, Nassau.
Tel. Nassau 77315.

Civil Aviation Authority, Airworthiness Division,
P.O. Box No. 1203, Suva, Fiji.
Cable Address. Bordair, Suva.
Tel. Suva 211-371.

Civil Aviation Authority, Airworthiness Division,
c/o Société Nationale Industrielle Aérospatiale, B.P. 3153,
31053, Toulouse, Cedex, France.
Tel. (61) 42-67-00, Ext. 31-96.

Civil Aviation Authority, Airworthiness Division,
c/o Civil Aviation Department, Hong Kong Airport,
Kai Tak, Kowloon, Hong Kong.
Cable Address. Wray, Aircivil, Hong Kong. Tel. Kowloon 829310.

Civil Aviation Authority, Airworthiness Division,
c/o Civil Aviation Department,
Terminal Building,
Norman Manley International Airport,
Jamaica, W.1.
Cable Address. Bordair, Jamaica.

Civil Aviation Authority, Airworthiness Division,
Office of the Director of Civil Aviation,
P.O. Box 30163, Nairobi, Kenya, East Africa.
Cable Address. Bordair, Nairobi. Tel. Nairobi 22315.

Civil Aviation Authority, Airworthiness Division,
c/o Department of Civil Aviation,
Subang International Airport,
Kuala Lumpur, West Malaysia.
Cable Address. Bordair, Kualalumpur, Malaysia.

Civil Aviation Authority, Airworthiness Division,
Aviation Safety Division,
c/o D.G.C.A., P.O. Box 17, Kuwait, Arabian Gulf.
Cable Address. Civair, Kuwait. Tel. Kuwait 710222, 710788, Ext. 4195

Civil Aviation Authority, Airworthiness Division,
c/o Department of Civil Aviation, Terminal Building,
Piarco International Airport, Arouca, Trinidad, W.I.
Cable Address. Bordair, Trinidad. Tel. Trinidad 664–4251.

Civil Aviation Authority, Airworthiness Division,
5108 Marlyn Drive,
Washington D.C. 20016, U.S.A.
Tel. 301-229-9229. Telex: 440194.

5 **Cancellation** This Notice cancels Airworthiness Notice No. 2, Issue 17, dated 1st April, 1972, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

AIRWORTHINESS NOTICE

No. 10

Issue 6.

20*th July*, 1972.

AIRCRAFT MAINTENANCE ENGINEERS' LICENCES —CATEGORIES AND RATINGS

1 The experience requirements for the grant, extension and renewal of Aircraft Maintenance Engineers' Licences are prescribed in Section "L" of British Civil Airworthiness Requirements, a clear understanding of which depends on cross-reference with this Notice No. 10.

2 Copies of Section "L" may be obtained from the Civil Aviation Authority, Technical Publications Department, Greville House, 37 Gratton Road, Cheltenham, Glos. GL50 2BN, at a cost of 50p each, post free.

3 The United Kingdom concurs with the current standards recommended by the International Civil Aviation Organisation (ICAO) for the grant of Type I and Type II ratings.

4 The extent to which the privileges of licences may be exercised is shown in the current issue of Airworthiness Notice No. 3.

5 **Categories "A" and "B"—Aeroplanes**

Where reference is made in a licence to all or any of paragraphs 5.1 (5.1.1, 5.1.2), 5.2 (5.2.1, 5.2.2, 5.2.3), 5.3 (5.3.1, 5.3.2), 5.4 (5.4.1, 5.4.2), the rating of the licence will include all the aeroplanes listed in the specified paragraph(s).

8.2 Airspeed Ambassador
Cessna 414, 421
Fokker F.27
H.P. 137 Jetstream 1
H.S. (Avro) 748
Percival Prince
Scottish Aviation Twin Pioneer
Short SC.7 Skyvan 3
Vickers Viscount 702, 815
Westland S.55
Westland Wessex 60

Where reference is made in a licence to all or any of paragraphs 8.3, 8.4 (8.4.1, 8.4.2), 8.5, 8.6, 8.7, 8.8, the rating of the licence will include all the instruments in the aircraft listed in the specified paragraph(s).

8.3	H.P. Herald 201, 210, 211, 213	Vickers Viscount 701
8.4		
	8.4.1 Reserved.	
	8.4.2 Beechcraft 100 Canadair CL44-D4 Grumman G.159 H.P.137 Jetstream 1	H.S.125 Vickers Viscount 812 Vickers Vanguard 952
8.5	Vickers Viscount 813	
8.6	A.W.650 Bristol Britannia D.H.106 (Comet)	Vickers Viscount 802, 806, 831 Vickers Vanguard 951, 953
8.7	Boeing 707-138B, 321, 436, 465	Boeing 720-051B
8.8	Sikorsky S.61N	Agusta/Bell 206B with Sperry Stars 3B System

9 Category "X"—Electrical

Where reference is made in a licence to paragraph 9.1 and/or 9.2 the rating of the licence will include all the electrical equipment in the aircraft listed in the specified paragraph(s).

9.1 Aircraft listed in paragraphs 5.1, 5.2, 5.3, 5.4, 7.1, 7.2, 7.3, 7.4 of this Notice No. 10 plus :—

	Beechcraft B90, C90, 100	Cessna 414, 421
9.2	A.W.650 Fokker F.27 Grumman G.159 H.P. Herald	H.P.137 Jetstream 1 H.S. (Avro) 748 H.S.125 Vickers Viscount

Where reference is made in a licence to all or any of paragraphs 9.3 to 9.13 inclusive, the rating of the licence will include all the electrical equipment in the aircraft listed in the specified paragraph(s).

9.3 Airspeed Ambassador

9.4 Bristol Britannia

9.5 D.H. 106 (Comet)

9.6 Boeing 707-138B, 321, 323c, 324c, 336, 340c, 349c, 355c, 365c, 373c, 379c, 399c, 436, 465
Boeing 720-051B

9.7 Vickers Vanguard

9.8 H.S. (D.H.121) Trident 1, 1E, 2E, 3B

9.9 VC.10 (1101, 1103, 1109), Super VC.10 (1151)

9.10 Sikorsky S.61N

9.11 B.A.C. One Eleven 200, 300, 400, 500 Series

9.12 Canadair CL44-D4

9.13 Boeing 737-204, 222

10 Multi-Category "X"—Instruments, Automatic-pilots and Compasses

Where reference is made in a licence to all or any of paragraphs 10.1.1 to 10.1.6 inclusive, the rating of the licence will include all the instruments, automatic-pilots and compasses in the aircraft listed in the specified paragraph(s).

10.1.1 H.S. (D.H.121) Trident 1, 1E, 2E, 3B

10.1.2 VC.10 (1101, 1103, 1109), Super VC.10 (1151)

10.1.3 Boeing 707-323c, 324c, 336, 340c, 349c, 355c, 365c, 373c, 379c, 399c

10.1.4 B.A.C. One Eleven 200, 300, 400 Series, 501, 509, 518, 523, 530

10.1.5 B.A.C. One Eleven 510

10.1.6 Boeing 737-204, 222

11 Extensions The CAA will consider extensions of licences in accordance with 11.1 or 11.2, as appropriate.

11.1 **Group Ratings** To include one or more of the groups of aircraft and/or engines specified in paragraphs or sub-paragraphs 5.1 (5.1.1, 5.1.2), 5.2 (5.2.1, 5.2.2, 5.2.3), 5.3 (5.3.1, 5.3.2), 5.4 (5.4.1, 5.4.2), 6.1 (6.1.1, 6.1.2), 6.2 (6.2.1, 6.2.2, 6.2.3), 6.3 (6.3.1, 6.3.2) and 7.1 if the current licence is rated for a minimum of two types of different manufacture in each sub-paragraph. Group ratings will not be granted for types specified in any other sub-paragraphs of paragraphs 5, 6 and 7.

11.2 **Combined Categories "A" and "C"—All Piston-engined Aeroplanes**

Application may be made for this rating, without examination, subject to compliance with (a) to (c).

(a) The applicant must hold a current United Kingdom licence which has been valid in Category "A" or "C" for 15 years, and in both Categories for the 10 years, immediately preceding the application.

(b) The licence must include in each Category, a representative selection of types specified in paragraphs 5.1 to 5.4 and 6.1 to 6.3 of this Notice No. 10.

(c) The applicant must be currently employed by an operator of aircraft registered in the United Kingdom and must have been engaged on the maintenance of such aircraft during the 3 years immediately preceding the date of application.

Holders of a licence rated for the Combined Categories "A" and "C"—All Piston-engined Aeroplanes, who wish to extend their licence in Category "A" or in Category "C" for types not included in paragraphs 5.1 to 5.4 and 6.1 to 6.3 of this Notice No. 10, should make application to the CAA, who will, having regard to the nature of the work on which they are engaged, advise the conditions for acceptance.

12 Category "R"—Radio

Where reference is made in a licence to all or any of paragraphs 12.1, 12.2 and 12.3, the rating(s) of the licence will include all the types of radio systems and their installation listed in the specified paragraphs.

12.1 Airborne Communication Systems, including VHF, HF and Audio

12.2 Airborne Navigation Systems, including ADF, VOR, ILS and Decca

12.3 Airborne Pulse and FM Systems, including Weather Radar, Doppler, DME, ATC Transponder, Loran and Radio Altimeter

13 Category "X"—Automatic-pilots (Automatic-stabilizers)

NOTE : For the purposes of licensing, automatic-stabilizers are deemed to be automatic-pilots, and in addition, automatic-pilots include related systems such as yaw and/or roll dampers and Mach trim devices.

Where reference is made in a licence to all or any of paragraphs 13.1 to 13.9 inclusive, the rating of the licence will include all the automatic-pilots listed in the specified paragraph(s).

13.1 Sperry, A3, A3a
Tactair

13.2 Piper/Mitchell Auto-Control I, II
Piper/Mitchell Auto-Flite
Cessna Nav-O-Matic 200
Brittain B2, B3, BSS
Sperry AL1
Sperry AL3

13.3 Ferranti Automatic Stabilizer FAS/2
SAS installed in Fairchild Hiller FH 1100 Rotorcraft

13.4 †Piper/Mitchell Altimatic I, II
†Piper/Mitchell Auto-Control III
†Cessna Nav-O-Matic 300, 400
†Brittain B4, B5
†Crouzet Radiostal
†Sperry AL30

13.5 †Smiths SEP 1

13.6 †Bendix PB10

13.7 †AFCS installed in Sikorsky S.61N Rotorcraft

13.8 †Agusta/Bell Stability & Control Augmentation System

13.9 Reserved

Where reference is made in a licence to all or any of paragraphs 13.10 to 13.14 inclusive, the rating of the licence will include all the automatic-pilots listed in the specified paragraph(s), but excludes automatic-pilots which have a coupled Category III landing facility and automatic-pilots installed in aircraft specified in paragraph 10 of this Notice No. 10.

13.10 ††Piper/Mitchell Altimatic III
††Cessna Nav-O-Matic 800
††Honeywell H-14
††Lear L2
††Mitchell Century III

13.11 ††Sperry SPL 45, SP 3
††Bendix M4C
††Collins AP101, AP103, AP104

13.12 ††Smiths SEP 2

13.13 ††Sperry A12, SP20

13.14 ††Bendix PB 20

NOTE : For the automatic-pilots marked † and †† see Airworthiness Notice No. 3, paragraphs 2.5.3 and 6.6.3.

14 Cancellation This Notice cancels ARB Notice No. 10, Issue 5, dated 7th July, 1971, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

AIRWORTHINESS NOTICE

No. 1

Issue 7.

7th November, 1973.

FOREWORD

1 General

1.1 Airworthiness Notices are issued by the Civil Aviation Authority to circulate information at short notice to all concerned with the airworthiness of civil aircraft.

1.2 Airworthiness Notices will replace ARB Notices as necessary, but in the meantime the latter will remain current. The two types will not be distinguished in the contents list. (See ARB Notice No. 79).

1.3 Until such times as all ARB Notices have been replaced by Airworthiness Notices, references in ARB Notices to 'the Air Registration Board', 'the ARB' and 'the Board', should be taken as references to the Civil Aviation Authority (CAA).

2 Contents List

2.1 The contents list will be reissued periodically to give particulars of all current Notices. When a Notice becomes redundant this will be notified by showing it as cancelled in the contents list.

2.2 The contents list is not always reissued with every issue of Notices, and recipients are therefore advised to keep it up to date by means of manuscript alterations as soon as they receive any new or revised Notices.

3 Arrangement

3.1 Each Notice is identified by a number, followed by an issue number and an issue date. This information is listed in sequence in the contents list.

3.2 When a procedure, which has already been the subject of a Notice, is changed, the particular Notice is re-issued under the same number, but bearing a new issue number and issue date.

3.3 Material differences between issues are marked by marginal lines.

3.4 Although all Notices are concerned with matters affecting the airworthiness of civil aircraft, some deal with matters which have a more direct effect on safety than others. In order to emphasise their relative importance, these Notices will, as they are issued or revised, be printed on pink paper. Such a scheme is also used for the CAA Aeronautical Information Circulars.

4 Publication and Distribution

4.1 One copy of each Airworthiness Notice is issued free of charge to each Owner of Civil Aircraft on the British Register, each Licensed Aircraft Engineer, and each Organisation Approved under the Air Navigation Order. Thereafter one copy each of all new and revised Notices will be issued during the period of validity of the certificate of airworthiness, licence or approval, as appropriate. Suitable binders for filing the Notices are also issued free of charge.

4.2 Additional sets of Notices, including binders, may be purchased at a cost of £1·00. Amendment service £1·00 per annum (1st May to 30th April).

5 **Enquiries** Enquiries about publication and distribution should be addressed to the Civil Aviation Authority, Printing and Publication Services, Greville House, 37 Gratton Road, Cheltenham, Glos. GL50 2BN. Enquiries about the technical content of the Notices should be addressed to the Civil Aviation Authority, Airworthiness Division, Brabazon House, Redhill, Surrey RH1 1SQ.

6 **Cancellation** This Notice cancels Airworthiness Notice No. 1, Issue 6, dated 1st April, 1972, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

AIRWORTHINESS NOTICE

No. 4

Issue 10.

16*th April*, 1974.

PROPELLERS APPROVED FOR USE ON CIVIL AIRCRAFT CONSTRUCTED IN THE UNITED KINGDOM

1 Propellers listed in the attached Appendix are approved for use on civil aircraft constructed in the United Kingdom in respect of which there are in force certificates of airworthiness duly issued by the Civil Aviation Authority.

NOTE : Propellers listed in this Notice also include those which have been approved for aircraft certificated in the Special Category only, and it would therefore be wrong to assume that the aircraft listed against a propeller type will automatically qualify for certification in other Categories with that propeller fitted.

2 For convenience, propellers are listed under types of engines, but each propeller is approved only for the specific engine-airframe combination shown.

3 Propellers manufactured after the date of this Notice to the same drawing numbers as those given in the attached list may, in addition, bear certain issue numbers. These issue numbers are used mainly to indicate minor modifications which do not affect safety, but in some cases the intention is to indicate changes in pitch or diameter.

3.1 Where an issue number has been used to indicate a minor modification and the pitch and diameter remain the same as against the drawing number shown in this list, it may be assumed that the propeller is approved.

3.2 Where an issue number has been used to indicate a change in pitch or diameter and either of these differ from the figures given in the attached list, the propeller is not approved unless it actually appears in this list.

4 Before fitting a variable-pitch propeller it is essential to ensure that the basic pitch-range setting conforms with the latest setting approved for the particular engine-airframe combination.

5 If it is desired to use a propeller not included in the list application for approval should be made in accordance with the procedure prescribed in Chapter A3-2 of British Civil Airworthiness Requirements.

6 For propellers approved for imported aircraft of foreign origin, reference should be made to the appropriate publications issued by the Airworthiness Authority concerned, or the relevant manufacturer. Information may also be obtained from the Civil Aviation Authority, Airworthiness Division, Brabazon House, Redhill, Surrey, RH1 1SQ.

7 **Cancellation** This Notice cancels Airworthiness Notice No. 4, Issue 9, dated 1st February, 1973, together with the Appendix attached thereto, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey, RH1 1SQ.

APPENDIX

Drawing No.	Diam. (ft)	Pitch (ft)	Aircraft
AIRESEARCH TPE 331-2-201A			
HCB3TN-5C/T10282 HB	8.5	VP	Skyvan 3
HCB3TN-5E/T10282 HB	8.5	VP	Skyvan 3
HCB4TN-5C/T10282HB-4P	8.25	VP	Skyvan 3A
ARDEM X			
Z3405	4.75	2.45	Turbulent, Nipper 3
Z3407	4.75	2.7	Turbulent
HR1201	4.75	2.45	Turbulent, Nipper 3
ASTAZOU XIIH and H1			
FH 76-2-07	8.2	VP	Skyvan Mk. 2
ASTAZOU XIV			
23LF-335/1017-0 ..	8.50	VP	Jetstream 100
ASTAZOU XVI C1 and C2			
23LF-335/1017-0 ..	8.50	VP	Jetstream 200
CENTAURUS 661			
PD85/466/1	16.00	VP	Ambassador
CHEETAH 15, 17 and 27			
CR30/242/1	8.25	VP	Avro 19
CR30/242/4			
CHEETAH 19			
61271A/X3	7.50	7.10	Anson
A66365			
CIRRUS MAJOR 2			
A66290/X1	7.00	4.58	Cygnet
LA520	6.67	4.59	Cygnet
Z974/1	6.23	5.26	M.18
CIRRUS MAJOR 3			
A66290/X1	7.00	4.58	Messenger
A66290/X6	7.00	4.98	M.18
A66670/X1	6.75	4.82	Messenger
A66697/X6	6.75	4.97	Auster J.5.G, Auster J.5.K, Messenger
A66697/X7	6.75	4.50	Auster J.5.G
A66940/X1	6.00	6.66	Aries
B67869/X1	6.96	4.58	Messenger
B67921/X1	6.67	4.50	Auster J.5.G, Messenger
B67941/X1	6.67	4.97	Auster J.5.G, J.5.K
C67975/X1	6.92	4.58	Messenger
C67999/X1	6.83	4.76	Messenger 2A
HR669	6.84	3.53	Messenger
LA520	6.67	4.59	Cygnet
Z3756	6.30	5.15	Messenger
Z6013	6.67	4.51	Blackburn B2, Messenger
Z6014	6.67	4.70	Messenger

Drawing No.	Diam. (ft)	Pitch (ft)	Aircraft
CIRRUS MINOR I			
A66580/X6	6.00	4.28	Auster 5.J.4, Taylorcraft "C" and "D"
B67936/X2	5.92	4.28	Taylorcraft "D"
C66897/X3	5.88	4.28	Taylorcraft "D"
LA505	5.87	3.38	Auster 5.J.4, B.A. Swallow 2, Taylorcraft "C" and "D"
LA544	5.88	4.15	Mosscraft M.A.2
LA617	6.65	2.75	Taylorcraft "D"
N209	5.87	3.38	B.A. Swallow 2
Z5701	5.50	4.78	Taylorcraft "D"
Z8020	5.87	4.27	B.A. Swallow 2, Taylorcraft "D"
Z8022	6.00	3.62	Auster 5.J.4, Taylorcraft "C" and "D", B.A. Swallow 2
CIRRUS MINOR II & IIA			
A66580/X1	6.00	4.61	Auster 5.J.1
A66580/X2	6.00	4.52	Auster 5.J.1
A66619/X1	5.75	5.22	Gemini
A66619/X2	5.75	5.09	Gemini
A66619/X4	5.75	4.93	Gemini
A66619/X6	5.75	4.79	Auster 5.J.1, Gemini
A66859/X2	5.50	5.46	Gemini
A66929	5.75	5.22	Gemini
B66883/X1	5.86	4.52	Auster 5.J.1
B67858/X2	5.75	4.79	Auster 5.J.1
B67859/X1	5.87	4.60	Auster 5.J.1
B67992/X1	5.73	4.74	Auster 5.J.1
B67933/X1	5.73	4.78	Auster 5.J.1
B67936/X1	5.92	4.52	Auster 5.J.1
B67943/X1	5.73	4.74	Auster 5.J.1
B67944/X1	5.75	4.74	Auster 5.J.1
B67987/X1	5.67	4.74	Auster 5.J.1
B67990/X1	5.92	4.52	Auster 5.J.1
C66631/X1	5.75	4.66	Auster 5.J.1
C66897/X1	5.88	4.52	Auster 5.J.1
C66897/X2	5.88	4.84	Auster 5.J.1
C66897/X3	5.88	4.28	Auster 5.J.1
C66914/X1	5.67	5.22	Gemini
C66934/X1	5.83	4.52	Auster 5.J.1
C67891/X1	5.94	4.52	Auster 5.J.1
FP400/2A-1 and -2 ..	5.42	5.07	Gemini, Auster 5.J.1
HR702	5.75	3.97	Auster 5.J.1
HR702/2	5.75	4.11	Auster 5.J.1
HR724	5.42	5.07	Gemini
HR1241	6.00	4.04	Auster 5.J.1
Z5435	5.50	4.65	Gemini

Drawing No.	Diam. (ft)	Pitch (ft)	Aircraft
CIRRUS MINOR II & IIA (Contd.)			
Z5641	6.00	4.04	Auster 5.J.1
Z5642			
Z5646			
Z5647			
Z5701	5.50	4.78	Auster 5.J.1, Gemini
Z5702	5.50	4.78	Gemini
Z5704	5.50	5.06	
Z5705	5.25	5.02	
Z5801	5.64	3.83	Auster 5.J.1
CONTINENTAL C75			
1188/3	6.33	3.48	Auster 5.J.2
1188/4	6.33	3.29	
1188/5	6.00	3.29	
Z5750	5.75	3.97	
Z5751	6.00	3.22	
CONTINENTAL C125			
FP422	5.67	5.65	Gemini
FP422/2	5.67	5.33	
HR728			
CONTINENTAL 0-200			
F-H2/LC14-183 110 7R	6.00	3.6	Linnet
HR1211	5.75	3.2	Auster J.4, Condor
HR1212	5.75	3.2	
Z5792	5.75	3.97	Linnet
Z5793	5.75	3.2	Auster J.4, Condor
R. R. CONTINENTAL 0-240A			
HR1631	5.83	4.16	Condor
HR1633	5.83	4.00	
1C172/EM	6.00	4.08	
R. R. CONTINENTAL 0200A			
1A101/DCM-69-52 ..	5.75	4.33	Linnet
1A.105/SCM/7053 ..	6.84	4.42	Beagle B121
Z5723	5.1	4.78	Linnet
Z5794	5.75	3.7	
HR1211	5.75	3.2	Auster J.4, Condor
HR1212	5.75	3.2	
CONTINENTAL G10-470			
2AF36C68/100 RFM-10	7.50	VP	Beagle B.206Y
CONTINENTAL GTS10-520-C			
3AF34C86/90LF ..	7.5	VP	Beagle B206 Series 2
HC-A3VF-2/V8833 ..	7.37	VP	

Drawing No.	Diam. (ft)	Pitch (ft)	Aircraft
DART 505 and 506			
CR141/4-20-4/18	10.00	VP	Viscount 744, 745, 749
CR147/4-20-4/20	10.00	VP	Viscount 732, 744
CR129/4-20-4/11, /16 CR139/4-20-4/17, /19	10.00	VP	Viscount 701, 707, 708, 720, 724, 737
CR148/4-20-4/21E	10.00	VP	Viscount 701, 702, 730, 734, 735, 736, 739, 744, 747, 772, 773
CR155/4-20-4/25/26	10.00	VP	Viscount
CR248/4-20-4/40, /41	10.00	VP	Viscount 701, 707
DART 510			
CR130/4-20-4/12	10.00	VP	Viscount 802, 803, 804, 805, 806, 807, 808
CR240/4-20-4/32 CR249/4-20-4/42	10.00 10.00	VP VP	Viscount 802, 806, 700D
DART 510 and 515			
CR130/4-20-4/12	10.00	VP	Viscount 739, 742, 745D, 748, 754, 755, 756, 759, 760, 761, 763, 764, 765, 768, 769, 776, 779, 781, 782, 784, 785, 786, 789, 794, 798
PD203/424/1 and /2	10.00	VP	Viscount 748, 754
DART 514			
CR201/4-30-4/20	12.00	VP	HSA 748 Series 1
DART 520			
CR178/4-20-4/32	10.00	VP	Viscount 806
DART 525			
CR179/4-20-4/33	10.00	VP	Viscount 812, 813, 814, 815, 816, 818, 827, 828, 831, 832, 833, 835, 836, 837, 838, 839
DART 525F			
CR179/4-20-4/33	10.00	VP	Viscount 843
DART 526			
CR186/4-30-4/16	11.50	VP	Argosy
DART 527 and 532-9			
CR187/4-30-4/18	12.50	VP	Herald
DART 530			
CR179/4-20-4/33	10.00	VP	Viscount 833
DART 531 and 531U			
CR212/4-30-4/22	12.00	VP	HSA 748 Series 2

Drawing No.	Diam. (ft)	Pitch (ft)	Aircraft
	DART 532, 532-2S and 532-2L		
CR212/4-30-4/22 ..	12.00	VP	Argosy
CR212/4-30-4/22 ..	12.00	VP	HSA 748 Series 2A
	DART 533-2, 534-2 and 535-2		
CR212/4-30-4/22 ..	12.00	VP	HSA 748 Series 2 and 2A
	GIPSY 1		
DH5180/5	6.33	5.08	DH.60G
	GIPSY 2		
DH5180/14	6.33	5.00	DH.60G
	GIPSY 3		
67104A/X2	7.00	5.10	DH.80A
67104A/X12	7.00	5.18	
DH5212/D	6.17	5.42	
DH5218/C	6.50	5.16	
E860/1	6.87	4.26	Blackburn B2
LA520	6.67	4.59	DH.80A
LA543	7.00	4.00	Blackburn B2
	GIPSY MAJOR (AUSTER 3)		
DH5220/P25	6.33	4.58	Auster 3
LA596	6.50	5.00	Auster 5.c
	GIPSY MAJOR 1		
5232/A/1	6.50	5.10	DH.83
61187A/X1	6.75	5.50	Hawk Trainer, Whitney Straight
61187A/X9	6.75	5.24	Falcon, Monarch
61187A/X11	6.75	5.18	Hawk Trainer
61326A/X1	6.17	5.92	DH.85, Whitney Straight
61326A/X2	6.17	5.56	Whitney Straight
61326A/X4	6.17	6.58	DH.85
61326A/X8	6.17	6.01	DH.85, Whitney Straight, DH.87B
61326A/X9	6.17	5.72	Monarch, Whitney Straight
61326A/X10	6.17	5.85	Whitney Straight
61414A/X2	6.58	5.65	DH.85
67104A/X2	7.00	5.10	DH.80A, DH.83, DH.85
67104A/X3	7.00	4.95	DH.87B
67104A/X4	7.00	4.77	DH.82A, DH.83, DH.85, DH.87B
67104A/X6	7.00	5.33	DH.80A, DH.83, DH.85
67104A/X7	7.00	4.71	DH.87B
67104A/X10	7.00	4.60	DH.82A, DH.83, DH.85, DH.87B
67104A/X11	7.00	5.52	DH.85
67104A/X12	7.00	5.18	DH.85, DH.87B, DH.82A
67104A/X13	7.00	5.40	DH.85
67104A/X14	7.00	4.52	DH.82A, DH.83, DH.85
67104A/X15	7.00	5.01	DH.85

Drawing No.	Diam. (ft)	Pitch (ft)	Aircraft
GIPSY MAJOR 1 (Contd.)			
67575A/X1	7.00	4.71	DH.82A
84723A/X1	7.00	4.84	DH.82A, DH.87B
94103A/X17	6.75	4.80	Falcon
A66016/X4	7.00	4.58	DH.82A
A66696/X1	6.75	4.83	Auster 5.J.1.B; J.1.N; 5.J.5; J.5.B; J.5.F; J.5.Q; 5D; 3
A66696/X3	6.75	4.67	Auster 5.J.1.B; 5.J.5; J.1.N; J.5.B
A66753/X1	6.75	5.01	Auster J.1.N, DH.82A
A66772/X2	6.50	5.00	Auster J.5.B
A66860/X1	6.50	5.66	Auster 5.c
A66911/X3	6.00	5.77	Hawk Trainer
A66938/X2	7.50	3.52	DH.82A, Jackaroo
A104940/X2	7.42	3.52	
A104940/X3	7.42	3.70	DH.82A
A104941/X2	7.34	3.56	Jackaroo
A104942/X2	7.25	3.59	
A104943/X2	7.17	3.75	
A104943/X3	7.17	3.62	DH.82A, Jackaroo
A104944/X2	7.09	3.62	Jackaroo
A104945/X2	7.00	3.60	
B66131/X1	5.92	5.92	Monarch
B66143/X1	6.74	5.49	DH.85, DH.87B
B66143/X2	6.74	4.69	DH.82A
B66980/X1	6.58	5.24	Falcon, Monarch
B67926/X1	6.42	4.80	Auster 5.J.5; 5.J.1.B; J.5.B
B67927/X2	6.00	4.60	DH.87B
B67940/X1	6.57	3.83	Auster 5D
B67995A/X1	6.33	5.12	Auster J.5.F
B104952/X1	6.92	4.07	Jackaroo
B104952/X2	6.92	3.95	
B104956/X1	6.30	5.12	Auster 5.J.1.B; J.1.N; 5.J.5; J.5.B; J.5.F; J.5.Q; 5D; 3
B104977/X1	6.37	5.12	Auster J.5.F
BA211/2	6.18	5.41	Whitney Straight
C66969/X1	5.92	4.50	DH.82A, DH.87B
C67887/X1	6.63	4.83	Auster 5.J.1.B; J.1.N; 5.J.5; J.5.B; J.5.F; J.5.Q; 5D; 3
C67927/X1	6.92	5.18	DH.87B
DH5180/14/21	6.33	5.00	Auster 5D
DH5200/M	6.33	4.50	Auster J.1.N; J.1.B; J.5
DH5208/C/2	6.33	4.92	DH.80A
DH5212/A	6.17	5.25	DH.90A
DH5212/C	6.17	5.17	DH.84
DH5212/D	6.17	5.42	Whitney Straight, DH.80A, DH.82A, DH.84, DH.90A
DH5212/G	6.17	5.14	DH.84
DH5218/B	6.50	5.10	DH.80A, DH.82A, DH.84

Drawing No.	Diam. (ft)	Pitch (ft)	Aircraft
GIPSY MAJOR 1 (Contd.)			
DH5218/BX/10	6.50	5.10	DH.83
DH5220/B	6.33	5.08	DH.82A
DH5220/G	6.33	4.58	DH.82A, DH.83
DH5220/H	6.33	4.92	Auster J.1.N., DH.82A, DH.83, DH.84
DH5220/L	6.33	4.75	DH.82A, Auster 5D, 5.J.5., 5.J.1.B
DH5220/M	6.33	4.50	DH.82A, Auster 5D, 5.J.1.B, 5.J.5, J.1.N
DH5220/P	6.33	4.58	Auster 5.D; 5.J.1.B; 5.J.5; J.1.N; J.5.B; DH.60G; DH.82A
DH5228A	6.00	5.25	DH.84
DH5228/B	6.00	5.12	
DH5230/H	6.33	4.92	Auster J.1.N
DH5232/A	6.50	5.10	DH.80A, DH.82A, DH.83, DH.84, DH.85
DH5232/B	6.50	5.30	DH.82A, DH.83, DH.84, DH.85
DH5234/A	6.75	5.08	DH.80A, DH.82A, DH.85
DH5234/B	6.75	4.95	DH.80A, DH.82A, DH.85, DH.87B
DH5234/D	6.75	4.80	DH.80A, DH.85, DH.87, Messenger
DH5234/E	6.75	4.50	DH.85, DH.87A, DH.87B
DH5234/H	6.75	4.30	DH.87B
DH5234/J	6.75	4.40	DH.85, DH.87B, DH.82A
DH5250/B	6.33	5.17	DH.80A, DH.90A, Auster J.1.N.
HR671	6.84	3.53	DH.82A, Jackaroo
LA506/3	6.50	4.35	DH.82A
LA510	6.50	5.36	Monarch, Whitney Straight, DH.85
LA520	6.67	4.59	DH.90A
LA523	6.50	5.16	Auster J.1.N
LA543	7.00	4.00	Blackburn B2
LA550	6.67	5.05	Hawk Trainer
LA550/1	6.67	5.05	DH.85
LA594/2	6.50	4.35	DH.82A
LA596	6.50	5.00	DH.82A, DH.84, DH.85, Hawk Trainer, Messenger, Whitney Straight
LA596/3	6.50	5.36	DH.87B
LA604	6.50	4.58	DH.82A, DH.84, DH.87B
LA623/2	6.84	3.53	Mercury
OP60/B	6.16	5.42	Hawk Trainer, Whitney Straight, Falcon
Z970	6.23	5.72	Hawk Trainer
Z970-2	6.38	6.23	Falcon
Z971	6.23	5.26	DH.82A, Monarch, Whitney Straight

Drawing No.	Diam. (ft)	Pitch (ft)	Aircraft
GIPSY MAJOR 1 (Contd.)			
Z973	6.23	5.50	DH.80A, DH.82A, DH.90A, Falcon, Hawk Trainer, Monarch, Whitney Straight, Auster J.1.N.
Z978	5.85	5.50	DH.82A, Auster J.1.N.
Z1510	6.36	5.20	DH.84
Z2010	6.50	5.65	Falcon
Z3101	6.42	5.22	DH.90A
Z3104	6.50	5.42	
Z5890	6.50	4.49	Auster 3; 5.D; 5.J.1.B; 5.J.5
Z8010	6.84	3.53	DH.82A, Jackaroo
Z8014	6.84	3.53	Auster J.5.B
ZD5220/1	6.33	4.83	DH.82A
871	6.50	3.05	DH.82A
1993	6.04	4.18	DH.82A
GIPSY MAJOR 1C			
66875/X4	6.50	5.84	Gemini
94103A/X13	6.75	4.92	Chipmunk
A66696/X1	6.75	4.83	Auster J.5.F
A66753/X1	6.75	5.01	Leopard Moth
A66875/X4	6.50	5.84	DH.82A
A66938/X3	7.50	3.70	Jackaroo
A104940/X3	7.42	3.70	Jackaroo
B66143/X2	6.74	4.69	DH.82A
B104951/X2	6.75	5.02	DH.82A
B104952/X1	6.92	4.07	Jackaroo
DH5220/M	6.33	4.50	Auster J.1.N
DH5220/P	6.33	4.58	Auster J.1.N, DH.82A, DH.83
DH5234/D	6.75	4.80	DH.85
LA596	6.50	5.00	Hawk Trainer
LA604	6.50	4.58	DH.82A
Z973	6.23	5.50	Gemini, Hawk Trainer
Z5620/2	6.50	4.33	Messenger
Z8010	6.84	3.53	DH.82A, Jackaroo
GIPSY MAJOR 1D			
67104A/X10	7.0	4.60	DH.87B
A66696/X1	6.75	4.83	Messenger
HR671	6.84	3.53	Messenger
LA596	6.50	5.00	Messenger
LA604	6.50	4.58	
Z971	6.23	5.26	
Z973	6.23	5.50	DH.90A
Z5620/2	6.50	4.33	Messenger
Z5623	6.50	4.30	
Z8010	6.84	3.53	

Drawing No.	Diam. (ft)	Pitch (ft)	Aircraft
GIPSY MAJOR 1J			
A104940/X2	7.42	3.52	DH.82A
DH5212/D	6.17	5.42	Hawk Trainer
HR671	6.84	3.53	DH.82A
LA604	6.50	4.58	DH.82A, Hawk Trainer
Z973	6.23	5.50	Hawk Trainer
Z8010	6.84	3.53	DH.82A
GIPSY MAJOR 10 Mks. 1-1, 1-3, 1-7			
A66578/X1	6.75	4.64	DH.85
A66661/X2	6.75	5.01	Chipmunk
A66661/X3	6.75	4.71	
A66661/X4	6.75	4.75	Auster 6A
A66696/X1	6.75	4.83	Auster J.1.N, DH.82A
A66696/X3	6.75	4.67	Auster J.5.L, Auster J.5.P, Chrislea Super Ace, Auster A61, DH.85, Auster 6A
A66696/X6	6.75	4.19	Auster J.5.P
A66753/X1	6.75	5.01	Chipmunk
A66875/X1	6.50	5.72	Gemini
A66875/X3	6.50	6.02	
A66875/X4	6.50	5.84	
A66875/X7	6.50	6.22	
A66938/X2	7.50	3.52	Auster 6A
A66938/X3	7.50	3.70	
A94103A/X11	6.75	5.34	Chipmunk
B67934/X1	6.62	4.71	
B67935/X1	6.75	5.01	
DH5232/AR/5 ..	6.50	5.10	DH.82A
DH5234-B	6.75	4.95	Beagle A.61
HR671	6.84	3.53	Chrislea Super Ace
HR708	6.33	4.33	Chrislea Super Ace
LA596	6.50	5.00	Gemini
Z971	6.23	5.26	Messenger
Z973	6.23	5.50	Gemini, Hawk
Z1510	6.36	5.20	Desford Trainer
Z5623/1	6.50	4.30	Messenger, Chrislea Super Ace
Z5672	6.25	4.44	
Z5780	6.50	4.05	
Z8010	6.84	3.53	
Z8014	6.84	3.53	Auster 6A, Beagle Auster A61, Beagle A61 Series 2
GIPSY MAJOR 10 Mks. 1-1A, 1-3A, 1-7A, Mk. 2, 2-1			
A66753/X1	6.75	5.01	Auster J.1.N, Chipmunk, DH.85, Gemini 3C
A66904/X1	6.50	5.24	Chipmunk, Desford/Bobsleigh
A67925/X3	6.75	4.67	Auster 6A, Beagle A61, Auster J.5.P, J.5.R, J.5.L

Drawing No.	Diam. (ft)	Pitch (ft)	Aircraft
GIPSY MAJOR 10 Mks. 1-1A, 1-3A, 1-7A, Mk. 2, 2-1 (Contd.)			
A67960/X1	6.75	4.67	Auster J.5.L, J.5.P, J.5.R, Auster 6A, Beagle A.61
A67960/X2	6.75	4.19	Auster J.5.P, Auster J.5.R
A67889	6.75	5.01	Chipmunk
B104972	6.47	5.01	
B104973	6.30	5.36	
B67871/X1	6.58	5.01	
D67972/X1	6.50	5.84	Chipmunk, Gemini
D67972/X2	6.50	5.20	Gemini
D67972/X5	6.50	5.72	Falcon, Gemini
D67989/X2	6.75	4.67	Auster J.5.L
D67996/X1	6.76	3.88	Chipmunk
D104967/X1	6.75	5.01	
HR864	6.50	4.58	Messenger, DH.87B
Z976	6.23	5.50	Falcon, Gemini
GIPSY MINOR			
DH5258/A	5.88	3.96	DH.94
DH5258/E	5.88	4.19	
DH5258/J	5.88	4.03	
DH5258/K	5.88	4.00	
HR1312	5.88	4.03	
GIPSY QUEEN 2			
PD30/211/1	7.00	VP	DH.89A, Proctor 1, 2, 3, 4, 5
GIPSY QUEEN 3			
61186A/X4	7.00	6.48	DH.89, DH.89A
61186A/X6	7.00	6.33	
61186A/X9	7.00	5.94	
61186A/X12	7.00	6.41	
A66327/X2	6.75	5.90	
A67967/X2	7.00	6.65	
A67967/X3	7.00	6.46	
A67967/X5	7.00	5.45	
B66936/X1	6.83	5.94	
B66937/X1			
B67982/X1	6.42	6.25	
GIPSY QUEEN 3 (M.V.P.)			
PD65/2WS/1	7.00	VP	DH.89, DH.89A
GIPSY QUEEN 30-2			
PD70/212/1/2	7.50	VP	Prentice
GIPSY QUEEN 30-3 and 30 Mk. 2			
PD136/212/1/2	7.00	VP	DH.114
PD170/212/1/2			
PD175/212/1/2			
PD190/212/1			

Drawing No.	Diam. (ft)	Pitch (ft)	Aircraft
GIPSY QUEEN 70-3 and 70-4			
PD116/312/1 to /7 inc.	7.50	VP	DH.104
PD143/312/1 to /7 inc.	7.50	VP	DH.104
GIPSY QUEEN 70 Mk. 2			
PD143/312/1 to /7 inc.	7.50	VP	DH.104
GIPSY QUEEN 70 Mk. 3			
PD143/312/1 to /7 inc.	7.50	VP	DH.104
GIPSY SIX 1			
61025A/X2	7.00	6.47	DH.86, DH.89, DH.89A
61052A/X3	7.00	6.29	DH.89, DH.89A
61052A/X5	7.00	6.03	
61186A/X2	7.00	6.66	DH.86, DH.86B, DH.89, DH.89A
61186A/X3	7.00	6.56	DH.89A, DH.89
61186A/X4	7.00	6.48	
61186A/X5	7.00	6.39	
61186A/X6	7.00	6.33	DH.86, DH.86B, DH.89, DH.89A
61186A/X7	7.00	6.28	DH.89, DH.89A
61186A/X9	7.00	5.94	DH.89A
61186A/X12	7.00	6.41	
61189A/X1	7.00	7.11	Hawk
61189A/X5	7.00	6.96	Hawk
61189A/X7	7.00	6.84	Hawk
61189A/X8	7.00	7.29	
61375A/X1	7.00	6.76	Gull
61375A/X2	7.00	7.03	Hawk
A66327/X2	6.75	5.90	DH.89A
A67967/X2	7.00	6.65	DH.89
A67967/X5	7.00	5.45	DH.89A
B66128/X1	7.00	6.75	DH.89, DH.89A
B66942/X1	6.67	6.62	Hawk
C66026/X1	6.75	6.81	DH.89, DH.89A
C66093/X1	6.75	6.66	DH.86B, DH.89, DH.89A
DH5238/F	6.75	6.30	DH.86, DH.89, DH.89A
DH5238/G	6.75	6.40	DH.86, DH.89, DH.89A, Heck
DH5238/H	6.75	6.40	DH.89, DH.89A
DH5238/J	6.75	6.20	
DH5244/A	6.75	6.40	
DH5244/B	6.75	6.30	
DH5246/B	6.75	6.20	DH.86, DH.89, DH.89A
Z1800	6.92	6.20	Hawk
Z2192	6.75	6.18	DH.89, DH.89A
Z2682/1	6.72	6.20	DH.86, DH.89, DH.89A
Z2682/7	6.56	6.18	DH.89, DH.89A
Z2687	6.56	6.43	DH.86, DH.86B
Z2688	6.56	6.29	DH.89, DH.89A
Z2689	6.56	6.50	DH.86, DH.86B

Drawing No.	Diam. (ft)	Pitch (ft)	Aircraft
GIPSY SIX 2			
PD30/211/1	7.00	VP	Proctor 1, 2, 3, 4, 5
PD154/211/1	6.75	VP	Mew Gull
PD209/211/1	7.00	VP	Mew Gull
HERCULES 630-639 Inclusive			
CR41/4B6/16	13.25	VP	Viking
CR44/456/2			
CR44/456/4			
CR44/456/12			
PD97/446/1, /2 and /3 ..	13.25	VP	Viking
PD98/446/1, /2 and /3 ..			
HERCULES 674			
PD97/446/1/2 and /3 ..	13.25	VP	Viking
PD98/446/1/2 and /3 ..	13.25	VP	Viking
HERCULES 734 and 735			
PD122/446/1/2/3 ..	14.00	VP	Bristol 170 Mk. 31 and Mk. 32
LEONIDES 501, 502, 503 and 504			
CR162/3-20-3/5 or /5P..	9.00	VP	President
PD158/313/1	9.00	VP	Prince
PD159/313/1			
PD184/313/1	9.00	VP	Beaver
PD232/313/1 and /2 ..	9.00	VP	Prince, President
LEONIDES 503/8, 504/8 and 514/8			
PD205/323/1	11.00	VP	Twin Pioneer
LEONIDES 514/5A			
CR143/3-20-3/2 ..	9.00	VP	President 2A
LEONIDES 531/8B			
PD237/323/1	11.00	VP	Twin Pioneer
LYCOMING GO-480-B			
Blade 9333C-3	7 50	VP	E.P.9
Hub HC82x20-1B ..			
P1033/G4-AD-0691236	7.75	VP	E.P.9
LYCOMING GO-480 G1A6			
Blade 9333C-3	7.50	VP	E.P.9
Hub HC83x20-1B ..			
P1033/G4-AD-0691236	7.75	VP	E.P.9

Drawing No.	Diam. (ft)	Pitch (ft)	Aircraft
LYCOMING O-235-C1			
M76/AM-2-48	6.16	4.00	Auster D4
Z5960	6.50	3.06	Auster D4
LYCOMING O-290-3			
1A.170.LL.7647 ..	6.33	3.92	Auster 5
FP420	6.25	4.18	Auster 4 and 5
HR1231	6.50	3.48	Auster 4 and 5
Z5594	6.00	3.67	Auster 4 and 5
Z5600	6.50	3.48	Auster 4 and 5
Z5602	6.50	3.19	Auster 4 and 5
LYCOMING O-320-A2B			
M74DMS-0-60	7.16	5.00	B121 Series 2
74DM6S5-0-60	7.16	5.00	B121 Series 2
LYCOMING O-320-D2C			
M74DMS-0-62	7.16	5.16	B121 Series 3
74DM6S5-0-62	7.16	5.16	B121 Series 3
LYCOMING O-320-B			
1A/175/GM 8052 ..	6.66	4.33	Auster D5
LYCOMING O-320-B2B			
M74DM56	6.02	4.08	Auster J5V
1A200/FAM-8043 ..	6.66	3.58	Auster D6
1A200/FAM-8046 ..	6.66	3.83	Auster J5V, Auster D5
LYCOMING O-360-A1A			
D236C14/78KM-4 ..	6.17	VP	Auster J.1.U, Auster D6, Beagle A.109
LYCOMING O-360-A2A			
1A200/FA-8240 ..	6.83	3.33	Auster D5
1A200/FA-8243 ..	6.83	3.58	Auster D5, Auster J.1.U, Auster D6
1A200/FA-8250 ..	6.83	4.16	Auster D5, Auster J.1.U, Auster D6
LYCOMING IO-360-A1B6			
HC-C2YK-4/C7666A-2	6.16	VP	Bulldog 100, 101, 102
HC-C2YK-4F/FC7666A-2	6.16	VP	Bulldog 100, 101, 102
LYCOMING O-540-E4C5			
HC-C2YK-2B/C8477-4 or /C8477A-4	6.66	VP	BN-2, BN-2A
HC-C2YK-2C/C8477-4 or /C8477A-4	6.66	VP	BN-2A MK.III

Drawing No.	Diam. (ft)	Pitch (ft)	Aircraft
LYCOMING IO-540-K1A5 AND K1B5			
HC-C2YR-2/C8477-4 or /C8477A-4	6.66	VP	BN2A-2
HC-C2YK-2/C8477-4 or /C8477A-4	6.66	VP	BN2A-2
MERLIN 55M			
CR26/4F5/9	10.41	VP	Spitfire 5B
MERLIN 66			
CR12/4F5/4	10.75	VP	Spitfire T.8
NIAGARA 3			
Z5740	6.50	8.26	Comper Swift
PROTEUS 705, 757			
PD208/466/3	16.00	VP	Britannia Mk. 100
PROTEUS 755, 756, 757, 758, 761, 762, 765 and 766			
PD208/466/2	16.00	VP	Britannia 300
TYNE 506 and 512			
PD223/466/2/3	14.50	VP	Vanguard 951, 952, 953
TYNE 515			
PD228/476/2/3	16.00	VP	CL44
WALTER MIKRON 2			
A66049/1X1	4.75	3.59	Tipsy Trainer
A66167/X4	5.50	3.44	Tipsy B, Tipsy Trainer
A66167/X5	5.50	3.90	Tipsy B
B66592/X1	5.25	3.56	Tipsy Trainer
LA511	5.05	3.92	Tipsy Trainer
LA553/2	5.35	3.22	Tipsy Trainer

AIRWORTHINESS NOTICE

No. 5

Issue 1.

1*st April*, 1972.

TYRE WEAR LIMITATIONS

1 Introduction

1.1 British Civil Airworthiness Requirements require that for certification of new types of aircraft, the depth of tyre tread below which wet braking friction characteristics are impaired should be specified at the time of certification; it is also required that it should be possible to determine, in operational conditions, when the tread depth is worn below this limit.

1.2 This Notice provides general guidance on the subject of tyre wear limitations for operators of all public transport aeroplanes of more than 5 700 kg maximum weight on the UK Register for which a limiting tyre tread depth is not otherwise available.

2 Discussion

2.1 Accidents and incidents, resulting from both loss of braking friction and loss of directional control on wet runways, continue to occur. While the scheduled accelerate-stop and landing distances provide some allowance for deterioration in friction, it has been established that this allowance is not sufficient to maintain the required level of safety if tyres which are more than 80% worn are used in wet runway operations.

2.2 As it is not possible fully to allow for this by increasing the scheduled distances (because of the frequency of incidents caused by loss of directional control, even on the most favourable wheel arrangements), the CAA favours the retention of current scheduled distances, together with a recommended minimum tread depth applicable to all aircraft tyres.

3 Recommendation In the absence of evidence of the safety of a lower limit for a particular aircraft/tyre/operation combination, it is recommended that a tyre be withdrawn from service when it is worn to such an extent that its wet runway

performance would be seriously impaired. This may be defined as when :—

(i) it is worn such that any groove has a depth of less than 2mm of tread for more than one quarter of the tread circumference
or

(ii) at any place on the circumference the tread pattern is worn to a depth of less than 2mm across the whole width of the tread in contact with the runway.

NOTE: This is not a rigid definition and equivalence may be provided if, for example, tyre wear is such that whilst one groove is less than 2mm all the others are 3mm or more.

for the Civil Aviation Authority.

Civil Aviation Authority,
Airworthiness Division,
Brabazon House,
Redhill, Surrey.

AIRWORTHINESS NOTICE

No. 6

Issue 18.

1*st March*, 1973.

AIRWORTHINESS PUBLICATIONS— GENERAL INFORMATION

1 This Notice gives details of the various publications which may be obtained from the CAA. Information regarding current dates of publication or issue numbers, as appropriate, is given in Airworthiness Notice No. 7.

2 Enquiries regarding the publications listed in this Notice should be addressed to the Civil Aviation Authority, Printing & Publication Services, Greville House, 37 Gratton Road, Cheltenham, Glos., GL50 2BN. Enquiries regarding documents forming part of the certificate of airworthiness (e.g. Flight Manuals and Performance Schedules for specific types of aircraft) should be addressed to the Civil Aviation Authority, Airworthiness Division, Brabazon House, Redhill, Surrey, RH1 1SQ.

3 In order to reduce administration costs to a minimum, a remittance must accompany every order for publications. The appropriate costs, which include packing and postage by surface mail, are shown in the following paragraphs.

4 **British Civil Airworthiness Requirements** British Civil Airworthiness Requirements comprise minimum requirements and constitute the basis for the issue of approvals and certificates required by the Air Navigation Order 1972.

4.1 The Requirements are purchasable at the following prices:—

Section A — General Information and Procedure ..	£1·00
„ C — Engines and Propellers	£2·00
„ D — Aeroplanes	£4·00
„ E — Gliders	£0·50
„ G — Rotorcraft	£2·00
„ J — Electrical	£1·00
„ K — Light Aeroplanes	£1·00
„ L — Licensing	£0·50
„ R — Radio	£0·50
Binder	£1·50
Reduced price for complete set with binder	£12·00
Section P — Provisional Airworthiness Requirements for Civil Powered-lift Aircraft ..	£4·00

8.2 The Register and all Supplements may be obtained from the CAA for an annual subscription of £18·50 (1st January to 31st December).

8.3 The Register and Supplements may also be obtained from the Bureau Veritas and the Registro Aeronautico Italiano.

9 CAA Approved Organisations

9.1 This is a list of firms approved under the Air Navigation Order, published as a loose-leaf volume and amended at two-monthly intervals. It is issued free of charge to all CAA Approved Organisations and the addresses are kept on the mailing list to receive amendments as they become available.

9.2 Additional copies including binders may be purchased at a cost of £5·00 which also includes the amendment service for one year. Subsequent amendments cost £5·00 per annum (1st April to 31st March).

10 British Hovercraft Safety Requirements

10.1 Design & Construction Requirements for UK Registered Hovercraft have previously been contained in the provisional British Civil Air Cushion Vehicle Safety Requirements. These have now been replaced by the British Hovercraft Safety Requirements (BHSR) which form the basis for hovercraft certification and for the approval of organisations to design, construct, maintain or overhaul hovercraft or hoverplatforms.

10.2 At the present time, BHSR contents have not been approved in their entirety, but those parts which are agreed and approved together with those parts of the provisional requirements which have not yet been replaced, are contained in a binder under the title British Hovercraft Safety Requirements.

10.3 The price, including binder, is £2·00 per set, and includes entitlement to issue of all amendments made up to 31st December 1973, without further charge. Thereafter, an amendment service will be operated at a price which has yet to be decided.

11 Syllabuses of Examinations for Aircraft Engineers

There are two examinations as follows:—

11.1 **Aircraft Maintenance Engineers' Licence** The syllabus for this is contained in Section "L" of British Civil Airworthiness Requirements and should be ordered under that heading.

11.2 **Aeronautical Engineering Certificate—Part I** A separate syllabus is available for this examination, price £0·50.

12 Specimen Performance Charts

12.1 Specimen Performance Charts and Tables provide general information for aeroplanes classified in Performance Groups A, C, D or E or aeroplanes having no performance group. They do not relate to any particular aeroplane, but give the information which is required for each performance group.

12.2 These publications are required primarily by pilots seeking licences, but they are also of value to those concerned with scheduling of performance.

Group A	£0·90
Group C	£0·60
Group D	£0·60
Group E	£0·25
Unclassified	£0·50

13 Foreign Airworthiness Directives

13.1 This publication relates to foreign constructed aircraft and includes all the modifications and inspections published as mandatory by the Authority in the country of construction, together with additional modifications and inspections as approved by the CAA.

13.2 It is in three volumes, as follows :—

Volume I FAA Summary of Airworthiness Directives for aircraft of 12,500 lb (5700 kg) or less.

Price £3·00 (which includes material available at present and all amendments by airmail until the publication is consolidated),

Volume II FAA Summary of Airworthiness Directives for aircraft above 12,500 lb (5700 kg).

Price £3·50 (which includes material available at present and all amendments by airmail until the publication is consolidated),

Volume III Directives issued by Authorities other than FAA.

Price £2·00 (renewable annually).

13.3 Volumes I and II contain CAA Additional Directives as a supplement. In the case of Volume III, which contains extracts from the foreign authorities' directives, the CAA Additional Directives are incorporated in these extracts.

13.4 FAA Supplements for Volumes I and II are supplied on a bi-weekly basis direct from the FAA Aeronautical Centre in Oklahoma City. Amendments to the CAA Additional Directives are issued as necessary. Amendments to Volume III are supplied on a monthly basis by the CAA.

13.5 Binders are available at £0·75.

14 Mandatory Aircraft Modifications and Inspections Summary This publication summarises mandatory modifications and inspections which must be incorporated in aircraft registered in the United Kingdom prior to the issue or renewal of certificates of airworthiness or by the date specified in the Summary. The Summary is divided into three parts, i.e. aircraft; engines and propellers; and aircraft radio stations, instruments and equipment. Amendments to the Summary are issued as monthly supplements with consolidations at intervals of six months. Copies, including binders, may be purchased at a cost of £3·00. Amendment service £1·50 per annum (1st April to 31st March).

15 TSS Standards TSS Standards have been written as part of the preparations for certification of the BAC/Aerospatiale Concorde by the French and the United Kingdom Airworthiness Authorities. They are used both as a basis for discussion of the applicable requirements and as a means of statement of the agreed certification standards. Price complete with binder £12·00. Amendment service (1st January to 31st December) £2·50.

16 Airworthiness Approvals Compendium

16.1 This publication gives information on CAA requirements and the associated general procedure necessary to obtain and maintain CAA Approval. It is published as a loose-leaf volume and amendments are supplied as necessary. One copy of the Compendium is supplied, on a complimentary basis, to firms holding CAA approval and to firms who have applied for approval. Amendments are supplied free of charge.

16.2 Additional copies including binders may be purchased at a cost of £3·00. The amendment service (1st February to 31st January) costs £1·00.

17 Handling the Big Jets A comprehensive textbook intended primarily for pilots converting to jet transport aeroplanes. Written by D. P. Davies, Chief Test Pilot of the United Kingdom Civil Aviation Authority, the book explains why the big jets behave as they do and suggests flight techniques for the more demanding manoeuvres. It is also of interest to aircraft engineers. Now in its third edition, which contains entirely new chapters on the Boeing 747 and asymmetric flight as well as up-to-date revisions to the text, the book is arranged in eleven chapters with twenty-four black-and-white plates and ninety-nine diagrams in colour. It is fully indexed and presented in hard covers (library edition). Price £3·50.

Authorised distributors overseas are as follows:—

USA and Canada
Pan American Navigation Service, Inc., 12021 Ventura Blvd., North Hollywood, California 91604, USA.

Australia
Technical Book and Magazine Company Pty. Ltd., 289—299 Swanston Street, Melbourne, Victoria, Australia 3000.

18 **World Airline Accident Summary** A summary of airline accidents involving aeroplanes of more than 5700 kg maximum weight which have occurred since 1st January, 1946. World coverage is provided, except that very few accidents are recorded for the People's Republic of China and the USSR. Sources of information are largely official (International Civil Aviation Organisation, National Transportation Safety Board, Department of Trade and Industry) but further data has been obtained from many reputable sources in the United Kingdom and elsewhere. The Summary is divided into three parts which list accidents according to type of accident (e.g. bird strike/ingestion, mid-air collisions, etc.), aircraft type and chronological order. In the chronological list the information is summarised from the reports available; viz.:— Date on which accident occurred, aeroplane type, registration marks, operator, location of accident, nature of flight, total number of persons on board the aeroplane, degree of injury to occupants, damage to aeroplane, a summary of events and, where possible, the probable cause. The Summary is contained in a loose-leaf binder. Price £25·00. Amendment Service £10·00 per annum (1st October to 30th September).

19 **Type Certificate Data Sheets** These Data Sheets constitute the documentation associated with Type Certificates which are issued by the CAA to signify approval of the design of certain types of aircraft. Further information is given in Airworthiness Notice No. 43.

NOTE : The description 'Type Certificate Data Sheet' is only applicable to Type Certificates for aircraft. Type Certificates are also issued for engines but the associated data sheets are described as 'Engine Type Certificate Data Sheet'.

20 **General Purpose Category Maintenance Schedules** These Maintenance Schedules have been prepared for use when complying with the provisions of the Air Navigation Order in relation to the General Purpose Category. They have been approved by the CAA and apply to aircraft which do not exceed 2730 kg maximum authorised weight. Separate Schedules are available for fixed-wing aircraft and helicopters. Each Schedule costs £0·75.

21 The following are published by Her Majesty's Stationery Office, and are obtainable from H.M. Stationery Office, P.O. Box 569, London, S.E.1 :—

Air Navigation Order
Air Navigation (General) Regulations

22 **Cancellation** This Notice cancels Airworthiness Notice No. 6, Issue 17, dated 1st April, 1972, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

AIRWORTHINESS NOTICE

No. 7

Issue 28.

8*th October*, 1974.

AIRWORTHINESS PUBLICATIONS— PUBLICATION DATES AND ISSUE NUMBERS

1 This Notice gives details of the latest publication dates or issue numbers, as appropriate, of the publications listed in Airworthiness Notice No. 6. It is intended as a guide to holders of Airworthiness publications to enable them to check the issue state of their publications from time to time. In this connection it should be noted that permanent mailing lists are only maintained for certain publications, as detailed in Airworthiness Notice No. 6.

2 Enquiries regarding the publications listed in this Notice should be addressed to the Civil Aviation Authority, Printing & Publication Services, Greville House, 37 Gratton Road, Cheltenham, Glos., GL50 2BN. Enquiries regarding documents forming part of the certificate of airworthiness (e.g. Flight Manuals and Performance Schedules for specific types of aircraft) should be addressed to the Civil Aviation Authority, Airworthiness Division, Brabazon House, Redhill, Surrey, RH1 1SQ.

3 Requirements

3.1 **British Civil Airworthiness Requirements** Details of the current sections of the Requirements are as follows :—

General Contents	*Issue* 58	25*th September*, 1974
General Foreword	*Issue* 36	25*th September*, 1974
Section A—Certification and Approval Procedures	*Issue* 18	25*th September*, 1974
Section C—Engines and Propellers ..	*Issue* 8	30*th August*, 1974
Section D—Aeroplanes	*Issue* 12	30*th August*, 1974
Section E—Gliders	*Issue* 2	16*th May*, 1960
Section G—Rotorcraft	*Issue* 3	15*th June*, 1966
Section J—Electrical	*Issue* 3	15*th September*, 1966
Section K—Light Aeroplanes ..	*Issue* 6	10*th April*, 1974
Section L—Licensing	*Issue* 6	1*st May*, 1970

Section N—Noise	*Issue* 1	11*th June*, 1974
Section P—Provisional Airworthiness Requirements for Civil Powered-lift Aircraft	*Issue* 2	*October*, 1972
Section R—Radio	*Issue* 4	10*th April*, 1974

3.2 **Joint Airworthiness Requirements (JAR)** Details of the current parts are as follows:—

JAR-E	*Engines*	15*th September*, 1972
JAR-P	*Propellers*	1*st December*, 1973
JAR-APU	*Auxiliary Power-units*	15*th May*, 1974
JAR-25	*Large Aeroplanes*	1*st August*, 1974

4 Civil Aircraft Inspection Procedures The current List of Leaflets for both Part I and Part II is *Issue* 11.

5 Airworthiness Notices The current Contents List is *Issue* 62.

6 Airworthiness Certification The second Edition of this Handbook was published in October, 1974.

7 International Register of Civil Aircraft This Register is amended by monthly supplements.

8 CAA Approved Organisations This publication is published in loose-leaf form and is amended by the issue of new or replacement pages at intervals of two months.

9 British Hovercraft Safety Requirements The current Issue is Issue 2, dated January, 1974.

10 Syllabuses of Examinations for Aircraft Engineers The syllabus for the Aircraft Maintenance Engineers' Licence is included in British Civil Airworthiness Requirements, Section L. A separate syllabus is available for the examination for the Aeronautical Engineering Certificate—Part 1. The latter was re-issued September, 1972.

11 Specimen Performance Charts Details of current issues are as follows :—

Group A ..	*Issue* 2	1*st December*, 1959
Group C ..	*Issue* 1	15*th April*, 1957
Group D ..	*Issue* 1	15*th April*, 1957
Group E ..	*Issue* 1	1*st April*, 1971
Unclassified ..	*Issue* 1	15*th April*, 1957

12 **Foreign Airworthiness Directives** This publication is amended at monthly intervals.

13 **Mandatory Aircraft Modifications and Inspections Summary** This publication is amended at monthly intervals.

14 **TSS Standards** The current Contents List is *Issue* 28.

15 **Airworthiness Approvals Compendium** The current Contents List is *Issue* 15.

16 **Handling the Big Jets** The third edition was published in December, 1971.

17 **World Airline Accident Summary** Published September, 1968. The Sixth Consolidated Amendment was issued April, 1974. Supplement Number Twenty-two was issued August, 1974.

18 **Type Certificate Data Sheets** The current Contents List is *Issue* 20.

NOTE : The description 'Type Certificate Data Sheet' is only applicable to Type Certificates for aircraft. Type Certificates are also issued for engines but the associated data sheets are described as 'Engine Type Certificate Data Sheet'.

19 **General Purpose Category Maintenance Schedules** The current issues are as follows :—

Fixed Wing Aircraft	*Issue* 2 *July*, 1972
Helicopters	*Issue* 2 *October*, 1972

20 **Cancellation** This Notice cancels Airworthiness Notice No. 7, Issue 27, dated 1st March, 1973, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

ARB NOTICE

No. 13

Issue 2.

5th October, 1967.

WESTON ALTIMETERS

1 The previous issue of this Notice referred to defects in the barometric scale and pointer drive gear in Model 22-374 altimeters manufactured by Weston Instruments Inc. since 1st June, 1966. The U.S. Federal Aviation Administration have now issued an Airworthiness Directive concerning a further serious defect affecting the balance arm assembly and the contents of this Notice have therefore been revised to cover both defects.

NOTE : The altimeters may be designated 22-374A, 22-374B and have various other postscripts to the basic model designation 22-374.

2 Weston Model 22-374 altimeters marked with a white M-1 on the back of the instrument have been modified to prevent a recurrence of both defects and none of the requirements of this Notice are applicable to altimeters so marked. The *unmodified* Model 22-374 altimeters are known to have been installed in the following aircraft :—

Cessna Models: 150G, 172H, 180H, 182J, 182K, 185E, 188, A188, P206A, P206B, TP206A, TP206B, TU206A, TU206B, U206A, U206B, 210F, 210G, T210F, T210G, 337B, T337B, 310L Serial Nos. 310L-0018 through 310L-0182, 320E Serial Nos. 320E-0055 through 320E-0276, 320F Serial Nos. 320F-0001 through 320F-0016, 401 Serial Nos. 401-0014 through 401-0122, 402 Serial Nos. 402-0032 through 402-0122, 411 Serial Nos. 411-0240, 411-0241, 411-0243, 411-0246, 411A Serial Nos. 411-0255 through 411-0276 aircraft.

Beech Models: H-18 Serial Nos. BA743 through BA750, A23A Serial Nos. M992 through M1064, A23-19 Serial Nos. MB154 through MB272 except MB266 and MB268, A23-24 Serial Nos. MB125 through MB272, V35 Serial Nos. D8250 through D8566, D8268 through D8274, except D8271, 35-C33 Serial Nos. CD1045 through CD1114, 35-C33A Serial Nos. CE80 through CE174, 56TC Serial Nos. TG1 through TG5 and TG8 through TG10, A65 Serial Nos. LC257 through LC268, 65-B80 Serial Nos. LD332 through LD348, LD351 and LD352, 65-88 Serial Nos. LP43 through LP45, 65-A90 Serial Nos. LJ237 through LJ304,

65-A90-1 Serial Nos. LM2 through LM37, LM39, LM41, and LM42, 95-C55 Serial Nos. TE186 through TE433, D95A Serial Nos. TD665 through TD687 and TD689 through TD704 aircraft.

Mooney Models: M20C, Serial Nos. 670001 through 670149, M20E Serial Nos. 1177, 1199, 1217, 1268, 1273, 1277, 1281, 1283, 1286 through 1288, 1290, 1292, 1293, 1295 through 1308, 670001 through 670062, M20F Serial Nos. 660001 through 660004, 670001 through 670486, Model M22 Serial Nos. 670001 through 670003 aircraft.

Aero Commander Models: 500B, 500U, 680FL, 680FLP, 680T aircraft.

Bell Models: 47G-2A, 47G-2A1, 47G-3B, 47G-3B-1, 47G-4, 47G-4A, 47G-5, 206A helicopters.

The unmodified Model 22-374 altimeter may have also been installed in other aircraft as a replacement part since 1st June, 1966.

3 Two distinct types of defect are involved :—

3.1 The accumulation of tolerances in some of the altimeters could cause the idler gear of the barometric scale and the pointer drive gear to disengage when a pulling force is exerted during the resetting process. Observable defects which may be indicative of an inaccurate altimeter are as follows :—

(i) Failure of an instrument to read known field elevation when set at existing altimeter setting.

(ii) Tendency of pointers to hang up or stick at any point during climb or descent.

(iii) Failure of pointers to move when barometric pressure scale is reset.

3.2 A broken or cracked balance arm assembly :—

(i) The result of a cracked balance arm assembly is loss of reliable altitude information.

(ii) A broken balance arm assembly causes a rapid increase in indicated altitude and a complete loss of reliable altitude information.

4 On all Weston Model 22-374 altimeters installed in United Kingdom registered aircraft, except those altimeters marked with a white M-1, proceed as follows :—

4.1 On and after 12th October, 1967, and before further flight under instrument meteorological conditions :—

(i) Observe altimeter reading (ground elevation) at 29.92 in Hg.

(ii) Pull outward on the baro mechanism knob and turn to the low end stop (or to the lowest barometric scale reading).

(iii) Turn the knob (still pulling outward) to the high end stop (or to the highest baro scale reading).

(iv) Observe carefully if the pointers move with the baro scale.

(v) Turn baro scale back to 29.92 in Hg and compare altimeter reading with reading in Step (i). The readings should be the same. If the readings are the same and if the pointers move with the baro scale, then the altimeter defect described in paragraph 3.1 is not present. If the pointers do not move with the baro scale or the reading of Step (v) does not agree with the reading of Step (i) then the altimeter is not working properly and it should be replaced.

4.2 Not later than 5th October, 1968 :—

(i) Modify altimeter by replacing balance arm assembly with an assembly identified by an M-1 stamped on the brass portion thereof available from Weston Instruments Inc., Weston-Garwin Carruth Division in accordance with Weston Instruments Inc., Weston-Garwin Carruth Division Service Bulletin 600-0002, **or**

(ii) Replace the altimeter with an altimeter known to be airworthy.

4.3 Until the altimeter is modified or replaced in accordance with paragraph 4.2, for those aircraft equipped with only one operative unmodified Weston-Garwin Carruth Model 22-374 altimeter :—

(i) On and after 12th October, 1967, flight is limited to those conditions in which flight is maintained with visual reference to the ground and when flight visibility is 3 miles or better, **and**

(ii) Within ten hours flight time after 12th October, 1967, a placard must be installed on the instrument panel in plain view of the pilot which states "This aircraft is limited to operations in those conditions in which flight is maintained with visual reference to the ground and when flight visibility is 3 miles or better".

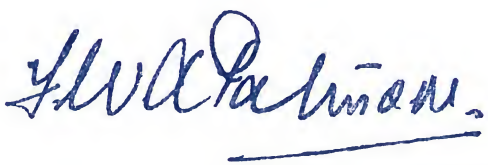
4.4 On and after 12th October, 1967, for those aircraft equipped with unmodified Weston-Garwin Carruth Model 22-374 altimeter(s), the pilot must make the following checks in order to determine if the altimeter(s) is operative :—

(i) Prior to the commencement of flight, check the altimeter reading(s) against the known field elevation at the appropriate altimeter setting(s). If a deviation of more than 100 feet is observed in the altimeter reading, and the aircraft is equipped with only one altimeter, further flight is prohibited until the altimeter is replaced with an altimeter known to be airworthy. If such a deviation is observed in one altimeter on an aircraft equipped with two unmodified Weston-Garwin Carruth Model 22-374 altimeters, flight may only be made in accordance with paragraph 4.3.

(ii) During flight, check the altimeter(s) for erroneous or erratic reading(s). If such readings are observed and the aircraft is equipped with only one altimeter, flight may be continued in accordance with subdivision (i) of paragraph 4.3 to the next point of intended landing. If such readings are observed in only one altimeter on an aircraft equipped with two unmodified Weston-Garwin Carruth, Model 22-374 altimeters, and the other altimeter is operative, flight may only be accomplished in accordance with paragraph 4.3.

5 Cancellation This Notice cancels ARB Notice No. 13, Issue 1, dated 8th September, 1967, which should be destroyed.

By Order of the Air Registration Board,



Secretary.

Brabazon House,
Redhill,
Surrey.

A. R. B. NOTICE

No. 14

Issue 1,

1*st January*, 1965.

THE ORDERING AND BONDED STORAGE OF AERONAUTICAL SUPPLIES FOR SERVICE AND CIVIL USE

1 The Ministry of Aviation and the Board have agreed a procedure for the ordering and bonded storage of aeronautical supplies commonly used for both service and civil aircraft. Details of this were first published in February, 1963, in D.G.I. Technical Regulation T/EXT/9, Issue 1.

2 It has now been agreed by the Ministry and the Board that the scope of the original agreement should be extended to include certain electrical and electronic components and, to take account of this, D.G.I. Technical Regulation T/EXT/9 has been re-issued. The content of the new Issue 2 has been agreed with the Board.

3 In the case of metallic materials it has been agreed that D.G.I. and A.R.B. requirements will be the same or compatible, and, in accordance with the agreement, Contractors may place common orders for materials which may be used for both military and civil aircraft. In the case of electrical or electronic components being governed by specifications and requirements acceptable to both D.G.I. and A.R.B., common ordering procedure may also be adopted. All such orders are to be endorsed: "Common Aeronautical Supplies".

4 Where supplies have been obtained under the procedure outlined in paragraph 3 above, they may be stored in common bins. Where supplies are released certified as complying with 6/49 Conditions only, or with A.N.O. Conditions only, then segregation is essential unless alternative arrangements have been agreed by the D.G.I. Supervising Inspector and the local A.R.B. Surveyor.

5 Manufacturers holding both M.O.A. and A.R.B. Inspection Approval who use a combined Release Note/Approved Certificate to cover the delivery of "Common Aeronautical Supplies",

are required to submit a draft combined certificate to their local A.R.B. Surveyor and to their D.G.I. Supervising Inspector for approval.

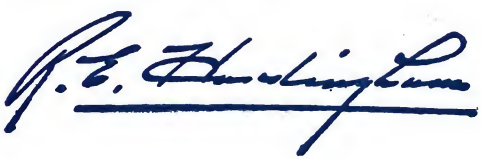
6 Supplies already ordered and released to Contracts Form 6/49 Conditions only may be used on civil aircraft provided the prior permission of the local A.R.B. Surveyor has been obtained in writing.

7 Items in respect of which there are concessions limiting the application or affecting the performance of the item in any way, may still be treated as "Common Aeronautical Supplies" provided such concessions have been agreed by both D.G.I. and A.R.B. In other cases, such items are to be released under Contracts Form 6/49, or A.N.O. Conditions, as applicable.

8 It is recognised that the success of this arrangement will depend on close co-operation between D.G.I. Inspectors, A.R.B. Surveyors and the Chief Inspectors of Approved Organisations.

9 **Cancellation** This Notice cancels Notice to Licensed Aircraft Engineers and to Owners of Civil Aircraft No. 14, Issue 1, dated 14th March, 1947, which should be destroyed.

By Order of the Board,



Secretary.

Air Registration Board,
Chancery House,
Chancery Lane,
London, W.C.2.

ARB NOTICE

No. 15

Issue 2.

1*st April*, 1971.

UNITED KINGDOM CERTIFICATION OF FOREIGN AIRCRAFT OF WEIGHTS NOT EXCEEDING 12 500 lb

1 Introduction

1.1 Importers of aircraft are reminded that in accordance with the requirements of Chapter A2-4 of British Civil Airworthiness Requirements (BCAR), all aircraft for which United Kingdom certification is required are subject to investigation by the ARB. The extent of this investigation may vary according to the type of aircraft, its intended use, and the requirements to which it was originally certificated in the country of manufacture.

1.2 The following paragraphs refer to fixed-wing aeroplanes. Information regarding the extent of technical investigation required for rotorcraft may be obtained on application to the ARB.

1.3 In general terms, when considering certification of foreign-built aeroplanes, the ARB needs to be satisfied that the airworthiness requirements to which the aeroplane has been designed provide safety equivalent to that provided by BCAR. ARB also needs to learn enough about the aeroplane to be able to supervise its continuing airworthiness.

1.4 Since the publication of Issue 1 of this Notice, a detailed comparison of US and UK airworthiness requirements has been made. The ARB will henceforth direct its investigation of US-built aircraft to matters on which the two sets of airworthiness requirements differ. It will also examine matters affected by major differences in the interpretation of requirements. Where other national airworthiness requirements are involved, and are accepted by ARB as equivalent to US standards, similar investigation will apply.

2 Technical Investigation

2.1 Conventional piston-engined light aeroplanes (up to 6000 lb for any category and up to 12 500 lb for Private Category certification), with a known history of satisfactory operation and built to airworthiness standards broadly equivalent to BCAR, are not normally investigated in depth. However, any unusual design feature or flying quality may be the subject of more detailed investigation.

2.2 Aeroplanes of weights above 6000 lb for certification in the Transport Category will normally be assessed in all areas for compliance with the British Civil Airworthiness Requirements that are not covered by the foreign certification. For example, special attention will be paid to the consequences of failure of the electrical system.

2.3 In the case of turbine-engined aeroplanes up to 12 500 lb a similar investigation will be made whatever the category of certification.

2.4 As a result of a technical investigation Special Conditions may be issued by the ARB. In this case the certifying authority of the country of origin may be asked to establish compliance with the Special Conditions.

3 Performance

3.1 For aeroplanes under 6000 lb, where certification other than in the Special Category is required, published performance data sufficient for compliance with the Air Navigation Order must be available.

3.2 For aeroplanes between 6000 lb and 12 500 lb, where certification in the Transport Category is required, the performance information must be adequate for scheduling in the applicable performance group.

4 Flight Testing

4.1 All aeroplane types new to the UK Register will be subjected to flight tests to provide information for subsequent airworthiness control.

4.2 For piston-engined aeroplanes between 6000 lb and 12 500 lb, where certification in the Transport Category is required, flight tests will be made to assess compliance with BCAR.

4.3 For turbine-engined aeroplanes up to 12 500 lb, where certification in any category is required, flight tests will be made to assess compliance with BCAR.

5 Change of Category If a piston-engined aeroplane between 6000 lb and 12 500 lb has been investigated only for certification in the Private Category and application is subsequently made for certification in the Transport Category, further technical investigation is likely to be necessary. This may result in additional Special Conditions with which the certifying authority of the country of origin may be asked to establish compliance.

6 Series Aeroplanes For subsequent aeroplanes of nominally the same type to be accepted as series aeroplanes, it is important that they and their equipment should be substantially similar to the first aeroplane of the type accepted for UK certification. Significant differences may require fresh investigation.

7 Notification

7.1 Importers of aeroplanes are advised to provide ARB with adequate notification of their intentions and to allow sufficient time for the ARB investigation to be completed before the required date for certification.

7.2 For the purpose of the technical investigation and flight testing, ARB staff will normally need to visit the manufacturer's premises. The time needed and the additional cost of this visit should be considered when importers notify the ARB of their intentions.

8 Cancellation This Notice cancels ARB Notice No. 15, Issue 1, dated 5th October, 1967, which should be destroyed.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

AIRWORTHINESS NOTICE

No. 16

Issue 4.

29th June, 1973.

AIRCRAFT ENGINES, PROPELLERS AND RELATED EQUIPMENT OBTAINED FROM UK GOVERNMENT OR FROM FOREIGN SOURCES

1 Where aircraft engines, propellers and related equipment are to be obtained from UK Government or foreign sources for installation in aircraft for which a Certificate of Airworthiness is required, conditions of acceptance are imposed by the CAA which normally involve compliance with paragraphs 1.1 to 1.9. Where doubt exists with regard to these conditions an enquiry should be made of the CAA.

1.1 The type and build standard must be acceptable to the CAA.

1.2 The organisation responsible for the original construction was, or is, acceptable for the purpose by the CAA.

1.3 Overhauls or repairs must have been undertaken either by an organisation that was, or is, acceptable to the CAA, or by an appropriately licensed aircraft maintenance engineer, and must be to a standard acceptable to the CAA. Where an appropriate agreement exists between the CAA and the national civil airworthiness authority of a foreign country, overhaul and repair organisations appropriately authorised by that authority will be acceptable to the CAA.

1.4 A list of any modifications or repair schemes, not approved by the original constructor, must be provided to the CAA, which will determine whether any are of sufficient significance to require further investigation prior to acceptance.

1.5 It must be established that the product is not unserviceable as a result of operation, inadequate maintenance or unsuitable storage. The assessment of this may depend to some extent on knowledge of the previous users. (See also Airworthiness Notice No. 18). Where an appropriate agreement exists between the CAA and the national civil airworthiness authority of a foreign country, a statement certifying serviceability issued by an organisation appropriately authorised by that authority will be acceptable to the CAA.

1.6 If it cannot be established that the conditions of 1.3 and 1.5 have been met, dismantling appropriate to any necessary inspection must be carried out, and suitable action must be taken to achieve an acceptable standard.

1.7 Civil name plates must be fitted, where applicable, and log books, as appropriate, must be issued. Any necessary information deriving from previous construction or overhaul (e.g. modification standard, test results) must be included, as certified true copies, in the log books.

1.8 Where military types are modified to comply with civil requirements, this must be done in conjunction with the constructor in each particular case, unless agreed otherwise with the CAA.

1.9 Any limitations (e.g. overhaul periods, retirement or ultimate (scrap) lives) must also be detailed in the log book.

2 Statements of compliance with the terms of this Notice (or such other terms as have been agreed by the CAA) must be made and certified by one of the following :—

(i) An organisation accepted by the CAA for the construction, overhaul, or repair, of the items concerned.

(ii) An Airworthiness Authority with which the CAA has an appropriate agreement.

(iii) An appropriately licensed aircraft maintenance engineer.

3 **Cancellation** This Notice cancels ARB Notice No. 16, Issue 3, dated 3rd May, 1971, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

AIRWORTHINESS NOTICE

No. 17*

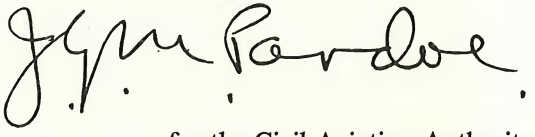
Issue 1.

1*st December*, 1972.

POWER PLANT FIRE HAZARDS—LIGHT, TWIN-ENGINED AIRCRAFT

Introduction

The letter, reproduced below, was circulated by the Federal Aviation Administration of the USA to owners of light, twin-engined aircraft fitted with mechanically-supercharged or turbo-supercharged engines of USA manufacture. As it is understood that this letter has not been circulated outside the USA, it is reproduced verbatim in order to bring the contents to the notice of owners and operators of aircraft of this type, which are registered in the UK. A "light" aircraft can be taken to mean any aircraft the maximum weight of which does not exceed 5700 kg.



for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

"Our records show you are the owner and/or operator of a light twin-engine airplane which is powered by mechanically-supercharged or turbo-supercharged engines. It is extremely important that these kinds of airplanes, which are powered by a sophisticated type of reciprocating engine, be properly maintained and operated to reduce powerplant fire hazards. The purpose of this letter is to obtain the highest possible level of safety by reminding you of the necessity to observe good maintenance and operating procedures as prescribed by the airplane and engine manufacturers.

Two recent fatal accidents occurred on light twin engine airplanes with mechanically-supercharged engines. Preliminary investigations show an engine failure initiated these fires. The fires progressed into the wheel wells and resulted in wing separation. In one instance, wing separation occurred within two or three minutes after take-off, and in the other instance, ten to twelve minutes after take-off. In the latter case, the number five cylinder came off at the base. Four of the cylinder base stud nuts were missing. The engine had just been top overhauled and had

* This number was previously used for a Notice concerning Extracts from Foreign Airworthiness Directives, which was cancelled in September, 1970.

accumulated only 30 minutes operating time prior to the accident. In both instances, oil and/or a supercharged air-fuel mixture was released into the engine compartment. The flammable mixtures ignited and the fire progressed into the wheel wells, burning through the fuel lines in this area. The extreme heat of the fire destroyed the structural integrity of the wing spars in the wheel well resulting in wing separation.

Besides these two recent fire accidents, service history records for light twin-engine airplanes with supercharged engines show other accidents have occurred involving aileron separation and fire spreading into the wing and fuselage. In addition, there have been a large number of fires of a less severe nature on both sides of the firewall. Many of the fires were caused by loose or disconnected fuel line and hose end fittings, leaking fuel strainer gaskets, chafing between electric wires or terminals and fuel lines or flexible hoses, leaking engine fuel pumps, broken augmentor drains, leaking primer solenoid valves, leaking oil filter adaptors, cracked fuel lines, and porous flexible hoses. It can be seen that these kind of leaks on either side of the firewall are potential fire hazards. Airworthiness Directives, FAA Inspection Aids, and manufacturers' service information have been issued concerning corrective action to reduce fires from these causes. Nevertheless, it is still necessary for owners and operators to inspect for leaks during routine and daily inspections and correct them when found.

In most cases, fires can be prevented or safely controlled by closely observing good maintenance and operating procedures as recommended by the airplane and engine manufacturer. At least the following procedures should be observed:

1 At the first indication of an engine fire or failure, the pilot should immediately shutdown the engine in accordance with the engine fire procedure in the Airplane Flight Manual. A landing should be made at the earliest opportunity.
It is of utmost importance in controlling engine fires that as soon as a fire is observed, the propeller should be feathered first, then fuel and oil valves closed, followed by turning off electric fuel boost pumps.

2 The engine manufacturer's prescribed overhaul times, practices, and techniques for properly maintaining the engine should be followed. After engine top overhaul, or cylinder change, the engine should be ground run and test flown as outlined in the engine operators manual or maintenance manual. After any work on the engine, a careful visual examination should be accomplished to assure the work is satisfactory.

3 Every 100 hours, or any time a fuel system component, line, or hose is replaced or disturbed, the fuel system should be tested for leaks under pressure, using the fuel boost pump or engine driven pump, as applicable. Special attention should be directed to fuel strainer gaskets, fuel line and hose end fittings, cracked and porous lines and hoses, cracks in fuel system component housings, and condition of drains.

4 Similar attention should be given to oil systems as applicable.

5 The firewall should be inspected and maintained to assure there are no openings which would permit an engine compartment fire to progress through the firewall.

Your close attention to the above procedures will result in improved airplane safety."

A. R. B. NOTICE

No. 18

Issue 2.

1*st February*, 1966.

ACCEPTANCE STANDARDS FOR THE MAINTENANCE, OVERHAUL AND REPAIR OF SECOND-HAND IMPORTED AIRCRAFT

1 For some years difficulty has been experienced in establishing compliance with the Board's requirements in respect of the maintenance, overhaul and repair on the acceptance of second-hand aircraft imported into the United Kingdom. Examples are as follows:—

1.1 Repairs having been embodied without supporting records to establish compliance with an approved scheme or manual acceptable to either the Board or other Airworthiness Authority.

1.2 Modifications having been embodied without adequate records to indicate the source of approval and the organisation responsible for installation.

1.3 Doubt as to the extent of compliance with the Board's maintenance schedule requirements, particularly those relating to major inspections or overhaul work which ensure the structural integrity of the aircraft (such as de-sealing of the integral fuel tanks) and the relation of component and accessory overhaul periods to those approved by the Board.

2 Prospective purchasers of second-hand aircraft from sources outside the United Kingdom are advised that, in future, before a Certificate of Airworthiness is issued in respect of an imported second-hand aircraft, the Board will require to be satisfied that:—

(i) Repairs and modifications comply with corresponding British Civil Airworthiness Requirements and that, if this cannot be established, satisfactory supporting records

are available from an acceptable source such as the original manufacturer, other Airworthiness Authority, or a suitably approved Design Organisation in this country.

(ii) Major inspections and overhauls have been carried out and all appropriate Airworthiness Directives complied with at, or within, those periods approved by the Board. When determining the period at which any requirement of the Board's maintenance schedule is due, the time at which the requirement was last done must be used as the basis of assessment.

(iii) Maintenance, Overhaul, Repair and Crew Manuals have been amended as necessary to correspond with the physical standard of the aircraft, and if the aircraft is of a type not previously certificated on the United Kingdom Register two copies of each manual should be lodged with the Board.

3 The above should be taken into account when negotiating the purchase of second-hand aircraft intended to be imported into the United Kingdom.

4 **Cancellation** This Notice cancels A.R.B. Notice No. 18, Issue 1, dated 1st January, 1965, which should be destroyed.

By Order of the Board,

Secretary.

Air Registration Board,
Brabazon House,
Redhill,
Surrey.

AIRWORTHINESS NOTICE

No. 19

Issue 5.

7th November, 1973.

THE PROBLEM OF BOGUS PARTS

1 The Federal Aviation Administration of the United States of America has long been concerned about 'bogus' parts, numbers of which have been found in use. Superficially many of these parts are identical with the genuine parts which they purport to replace.

2 In order to give wide publicity to this serious problem, the Flight Safety Foundation of America has prepared and published a comprehensive illustrated booklet on the subject. In the booklet bogus parts are defined as follows :—

"Parts which are not airworthy. Parts the source and identity of which have long been lost. Parts of unknown material, fabricated by processes at variance with industry and Government specifications . . . ."

The booklet, under the title "Bogus Parts, a Continuing Threat to Safety in Aviation" is obtainable from Flight Safety Foundation Inc., Pomponio Plaza East, 1800 North Kent Street, Arlington, Virginia 22209, USA, price $1.00. Discount rates are available for larger quantities.

3 This Notice is re-issued to draw attention to a practice which it is understood has developed in the USA and which could result in the supply of aircraft spare parts which are not acceptable under FAA procedures, and consequently not acceptable by the CAA.

3.1 Under contracts with the US Department of Defense, spares for US military aircraft may legitimately be supplied, and marked with the original manufacturer's part number, by suppliers other than the Production Certificate holder. Such parts may ultimately find their way onto the civil market, but would not be acceptable for use on UK registered aircraft.

3.2 It is understood that the FAA treats parts (other than those manufactured under the approved Parts Manufacture Approval System (PMA)) which are not manufactured under the control of the Production Certificate holder, as 'bogus', since they are not manufactured under FAA quality control surveillance. The only way in which the origin of parts can be established is by the inspection stamp or sticker, but if this has been erased or painted over the origin cannot be established, and such parts must be treated as bogus.

3.3 Although this state of affairs could apply to any aircraft which is used for both US military and civil purposes, particular care should be taken in instances where it is known that there is a large military involvement, and where the parts are purchased from other than the Production Certificate holder.

4 Experience in the United Kingdom shows that the problem of bogus parts is not confined to the United States, and typical examples, which are on the files of the CAA, serve to show that care is necessary when buying aircraft spares of foreign origin. Such items should be purchased either direct from the manufacturer, or from a source known from the purchaser's own experience to be reputable.

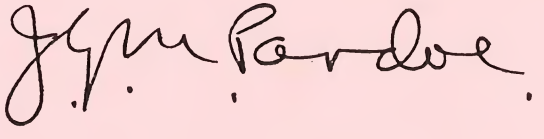
4.1 Recent experience has confirmed the existence of a source of bogus exhaust valves which could be used in Gipsy Queen 70 engines. Investigations have shown that these valves vary significantly from the manufacturer's specification, but these variations are not easily detectable.

4.2 Rolls-Royce (1971) Limited advise that properly released valves are identifiable by a five digit part number, together with a combined letter/number code relating to internal release identification. These marks are positioned around the stem of the valve, on the blending radius adjacent to the collet grooves. Other markings which may also appear, are the material specification and the manufacturer's inspection number.

4.3 Where the origin of a valve cannot be established to the satisfaction of the user, the part should be referred to Rolls-Royce (1971) Limited, who will check its authenticity.

5 Airworthiness Notice No. 11 gives advice on the acceptance of aircraft parts from foreign countries and should be referred to as necessary.

6 Cancellation This Notice cancels ARB Notice No. 19, Issue 4, dated 8th April, 1970, which should be destroyed.



for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

AIRWORTHINESS NOTICE

No. 20

Issue 4.

1*st December*, 1972.

FABRIC-COVERED AIRCRAFT

1 Introduction This Issue 4 revises the requirements for the issue or renewal of Certificates of Airworthiness, in the light of recent experience of the inspection of structures following the removal of fabric.

2 Structural Damage and Deterioration

2.1 Removal of the fabric covering during the survey of some older types of aircraft has revealed unsuspected structural damage and deterioration which could lead to catastrophic failure in flight. Instances of cracks in main spars and deterioration of timber as a result of water soakage have been found.

2.2 The possibility of damage or deterioration occurring can be reduced by the provision of good hangarage, regular cleaning and maintenance. To ensure that no damage or deterioration passes undetected periodical detailed inspection of the structure is necessary.

2.3 Following such incidents as heavy landings, ground collisions etc., the extent of inspections should be such as to ensure that any hidden damage does not pass undetected.

2.4 Details of inspections should be entered in the aircraft log book.

3 Fabric covering Many factors, particularly age and exposure to the weather, influence the life of fabric covering, and instances have occurred where the fabric has deteriorated to an unacceptable condition. The airworthiness of fabric covering should, therefore, be assessed very carefully by a method acceptable to the CAA, and in this respect factors such as hangarage, usage, climatic conditions, etc. should be taken into account when determining the frequency of inspection for this purpose.

NOTE: A suitable type of fabric tester and its method of operation is described in CAIP Leaflet BL/6-25.

4 Rib-stringing

4.1 The rib-stringing of fabric-covered components of some older types of aircraft has been changed during overhaul or repair, and replacement stringing other than that originally specified has been used. For example, single No. 18 linen thread has been used for rib-stringing in place of the specified flax cordage.

4.2 If a repair, overhaul or modification is made to a fabric-covered component, and replacement of the rib-stringing is required, the originally specified stringing, or an acceptable alternative agreed by the manufacturer or by an approved design organisation, must be used.

NOTE: Flax cordage complying with BS.F35 or braided nylon cord complying with DTD.786 is normally used for rib-stringing, but *doubled* No. 18 linen thread complying with BS.F34 may be used as an alternative if approved by the aircraft manufacturer.

4.3 Where an incorrect type of rib-stringing has been used, Licensed Aircraft Maintenance Engineers may not sign Certificates of Release or Certificates of Compliance until the stringing has been replaced with a type complying with the original specification or an acceptable alternative agreed by the manufacturer or by an approved design organisation.

5 Certification Requirements

5.1 Certificates of Airworthiness will only be renewed or issued if the requirements of paragraph 5.2 and 5.3 are complied with.

5.2 Certified evidence must be produced to show that the internal structure of fabric-covered aircraft has been exposed for adequate inspection to ensure integrity of the structure and for overhaul and repair as necessary. The extent of inspection which is adequate will be related to such factors as the age of the aircraft, the time since last full inspection, the inspection history of the aircraft, the known usage, and condition of hangarage.

5.3 The certification of the work carried out must be made by an appropriately Licensed Aircraft Maintenance Engineer, or under the authority of a suitably approved organisation. Log book entries, in sufficient detail to provide a suitable record for future reference, should be made, and should clearly indicate the extent of opening up, overhaul, repair and re-covering.

6 Guidance

6.1 Recommendations on the fabric covering of aircraft structures are given in Civil Aircraft Inspection Procedures Leaflet BL/6-25, on the doping of fabric-covered structures in CAIP Leaflet BL/6-26, on the inspection of wooden aircraft structures in CAIP Leaflet AL/7-9 and on the inspection of metal aircraft structures in CAIP Leaflet AL/7-13.

6.2 Attention is drawn to Airworthiness Notices Nos. 50 and 67 which refer to deterioration in wooden structures and in glued joints in aircraft.

7 Cancellation This Notice cancels ARB Notice No. 20, Issue 3, dated 20th January, 1971, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

ARB NOTICE

No. 21

Issue 2.

1*st April*, 1969.

MICROBIOLOGICAL CONTAMINATION OF FUEL TANKS OF TURBINE ENGINED AIRCRAFT

1 Introduction

1.1 Reports have been received that aircraft regularly operating in climatic conditions such as those prevailing between the latitudes 30° North and 30° South have been contaminated in the fuel tanks by a fungus. Another aircraft, regularly operating from the United Kingdom, was found to have localised areas of heavy growth when inspected after standing in a heated hangar for two months with fuel in the tanks. It is considered that the storage conditions were a contributory factor.

1.2 In one case contamination was found during an investigation into the cause of erratic fuel contents indication, when white crusty deposits and brown stains were seen on the probes. Further examination revealed the presence of brown/black slimes adhering to horizontal upward facing surfaces within the tanks. Examination by the Commonwealth Mycological Institute, Kew, confirmed that this substance was a fungal growth of the type Cladesporium Resinae.

2 Effects of Contamination

2.1 The problems associated with microbiological growths have been known for some years and research into their behaviour has been conducted throughout the world. In the case of Cladesporium Resinae, the spores of the fungus can exist in a dormant state in kerosene fuels in most parts of the world. These will only develop when in contact with water in fuel at temperatures such as those reached when the aircraft or storage tanks are exposed to a warm ambient temperature such as radiation from the sun for long periods in a tropical or sub-tropical environment, or prolonged periods in a heated hangar. If developing fungus forms on water not drained off and which adheres to the tank surfaces, the fungus is able to absorb water later introduced with fuel or condensing following a cold soak.

2.2 Where fungus has formed there is a probability that corrosion will occur. Corrosion has been found where fungus had formed on the bottom tank skin, on the chordal support member in the wing root and on fuel pipes within the tank. In some cases aircraft have been sufficiently affected to necessitate replacement of some component parts.

2.3 The fungus itself, if dislodged by fuel during refuelling, can obstruct fuel filters.

3 Inspection

3.1 Operators uplifting fuel or operating regularly in areas having high normal ambient temperatures and high humidity or where fungus development is known to have been encountered, are advised to scrutinise tank areas for signs of fungus whenever access is gained for any purpose. It is further recommended that, for aircraft operating under these conditions, Maintenance Schedules should be amended to include a visual internal tank check at periods prescribed by the aircraft constructor. It is also important, whenever fuel tanks are inspected, to ensure that all passage ways between rib cleats, etc., are not obstructed, so that a drainage path for water is maintained at all times. If the aircraft has been standing in a heated hangar for prolonged periods the fuel in the tanks should be treated with a biocide (see paragraph 4).

3.2 If contents gauges give suspect indications, immediate consideration should be given to the possibility that tank probes may be contaminated with water and/or fungus and appropriate inspections should be carried out.

3.3 Whenever fuel filters are checked they should be closely examined for the presence of slimes of any colour.

3.4 The need to prevent water collection by good maintenance practices and control of fuel supplies is emphasised. A high degree of protection can be maintained by strict adherence to water drain checks before and after refuelling and, if the aircraft has been standing for any length of time, again before the next flight. Fuel quality control checks should be rigorously applied.

4 Treatment

4.1 If fungus is discovered, the fuel system should be cleaned as soon as possible by a method approved by the aircraft constructor and the engine manufacturer. It must be

appreciated that if the fungus is allowed to develop, cleansing and rectification could become a major operation involving grounding of the aircraft for a long period.

4.2 It is strongly recommended that when aircraft operate in an area where fungal growth can be encountered, or where there is any possibility of temperatures in the fuel tanks frequently rising above 25°C, a fungicide additive should be used in the fuel as approved by the aircraft constructor and the engine manufacturer. (For example, Rolls-Royce have approved the use of Biobor J.F. or Methyl Cellosolve.) To be effective, Methyl Cellosolve must be used regularly; British Aircraft Corporation recommend that for BAC One-Eleven aircraft fuel treated with Methyl Cellosolve should be uplifted at least once every 24 hours. Biobor J.F. however can be used intermittently. Treatment with fuel containing Biobor J.F. over a period of 72 hours should remain effective for as long as three months. It is emphasised that the frequency of treatment and the dilutions prescribed by the aircraft constructor and the engine manufacturer must be adhered to. Introduction of an unapproved fungicide or inhibitor may jeopardise the safe operation of the aircraft.

5 Cancellation This Notice cancels ARB Notice No. 21, Issue 1, dated 16th September, 1968, which should be destroyed.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 22

Issue 3.

1*st August*, 1969.

OVERSEAS AIRWORTHINESS AUTHORITIES

1 The ARB is prepared to supply free of charge one copy of each of the following ARB publications to Airworthiness Authorities throughout the world :—

British Civil Airworthiness Requirements
Civil Aircraft Inspection Procedures
ARB Notices
Mandatory Aircraft Modifications and Inspections Summary
Type Certificate Data Sheets (see ARB Notice No. 43)

2 Applications for copies of these publications should be addressed to, The Secretary, Air Registration Board, Technical Publications Department, Greville House, 37 Gratton Road, Cheltenham, Glos., England, stating the exact method of address and whether there is an address in London to which the publications may be sent for onward transmission.

3 **Cancellation** This Notice cancels ARB Notice No. 22, Issue 2, dated 1st January, 1969, which should be destroyed.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

A.R.B. NOTICE

No. 23

Issue 1.

1*st December*, 1966.

CIRRUS ENGINES (CONTROLS)

1 A case is on record of a ball joint becoming detached from a spring loaded socket on ball and socket joint type EA.767/3, resulting in complete loss of power during flight.

2 The subsequent investigation revealed that it was possible for the ball joint to become detached when the adjusting pad was tightened up and then slackened off to the extent of $\frac{1}{2}$ to $\frac{3}{4}$ of a turn. It was also shown that it was possible for the control rod to be screwed into the socket to such an extent as positively to lock the ball between the concave pads.

3 All aircraft fitted with Cirrus Minor or Cirrus Major engines must be inspected as follows after each fifty hours' flying :—

3.1 Inspect all ball and socket joints type EA.767/3 and ensure that there is at least $\frac{1}{16}$ in. clearance between the socket and the lever arm to which the threaded portion of the ball joint is attached.

3.2 Ensure that the control rods do not foul any adjacent structure or mechanism throughout their full range of movement.

3.3 Ensure that the screwed end of the control rod is in safety in the socket, but does not protrude into the socket housing.

3.4 Ensure that the spring behind the inner concave pad in the socket is serviceable.

3.5 With the controls assembled, screw up the adjusting pad in each socket until the ball joint is clamped tight, then slacken off until the next split pin hole in the socket is in line with the

slot in the adjustment pad. Under no circumstances should the adjustment pad be slackened more than $\frac{1}{4}$ of a turn. Lock in the approved manner with $\frac{1}{16}$ in. split pin.

4 Cancellation This Notice cancels Notice to Licensed Aircraft Engineers and to Owners of Civil Aircraft No. 23, Issue 1, dated 24th December, 1947.

By Order of the Board,

Secretary.

Air Registration Board,
Brabazon House,
Redhill,
Surrey.

AIRWORTHINESS NOTICE

No. 24

Issue 13.

8th October, 1974.

AIRWORTHINESS COURSE

1 In response to requests to the CAA for discussion on airworthiness matters, and in particular, for an exposition of how airworthiness control is exercised in the UK, a residential Course is held at Eliot College, University of Kent, Canterbury. The Course is organised by the CAA and is intended primarily for members of Overseas Airworthiness Authorities. The selection of personnel for attendance at the Course is left entirely to the discretion of the Government or organisation sponsoring a student. All that is required of such personnel is that they have an active participation or interest in airworthiness matters. The basic language for the Course is English.

2 The Course Leader is a member of the staff of the CAA Airworthiness Division, and the Course is conducted using the technique of talks on particular subjects by practising specialists, followed by discussions on the talks which can be taken to any desired level within the time available. Although the Course is concerned primarily with airworthiness matters, some time is allocated to associated operational matters, to air law, and to accident investigation. In addition, there will be contributions from constructors and operators, and some visits to operational and manufacturing facilities.

3 Although participants can obtain an appreciation of airworthiness in operation, from both the technical and procedural view points, from the Course Lectures, they are encouraged, in the free time available, to engage in further discussions according to their particular needs. Appropriate literature is available for study in a room reserved for use by members of the Course. By these means the CAA is thus able to impart information on the collective effort necessary to establish a satisfactory airworthiness standard.

4 The fee for the Course is £400, which includes residence at Eliot College, all meals, and use of the University amenities. A cancellation fee may be charged should an application be withdrawn.

5 The next Course will be held from 1st April, 1975 to 19th April, 1975, and those attending the Course are expected to arrive on the afternoon of Tuesday, 1st April, at the University of Kent. Full details of all arrangements may be obtained from the Civil Aviation Authority, Department OSO5, The Adelphi, John Adam Street, London WC2N 6BQ, to whom applications to attend the Course should also be sent.

NOTE: For the convenience of students, the Midland Bank, 1 The Parade, Canterbury, has a 'student banking' arrangement.

6 The provisional commencing date for the 1976 Course is 20th March.

7 **Cancellation** This Notice cancels Airworthiness Notice No. 24, Issue 12, dated 1st December, 1973, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

ARB NOTICE

No. 25

Issue 4.

10*th December*, 1970.

TSS STANDARDS

1 As part of the preparations for certification of the BAC/SNIAS Concorde, the French and United Kingdom Airworthiness Authorities have prepared a series of documents known as TSS Standards. These are used both as a basis for discussion of the applicable requirements and as a means of statement of the agreed certification standards.

2 Copies of the Standards may be obtained from the Secretary, Air Registration Board, Technical Publications Department, Greville House, 37, Gratton Road, Cheltenham, Glos., GL50 2BN, England. The price is £10. 0s. 0d. (£10.00) per set including binder, amendment service £2 10s. 0d. (£2.50) per annum (1st January to 31st December).

3 **Cancellation** This Notice cancels ARB Notice No. 25, Issue 3, dated 1st February, 1968, which should be destroyed.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 26

Issue 2.

1*st April*, 1971.

SAFETY BELT TYPES ME 2402 AND ME 2402T (FORMERLY MILLS EQUIPMENT)

1 Issue 1 of this Notice dated 20th October, 1964, was titled 'Mills Equipment ME 2095 Safety Belts', and 31st December, 1965, was given as the latest date for compliance. Particulars of the applicable modifications are now included in the ARB Summary of Mandatory Aircraft Modifications and Inspections. The present Issue of this Notice deals with Safety Belt Types ME 2402 and ME 2402T.

2 Cases have been reported where passengers were unable to free themselves from Safety Belts of these types. Subsequent examination revealed that this was due to the PVC tip on the end of the left hand strap having partially peeled away across the webbing, with the result that it folded and jammed in the quick release mechanism during release.

3 Operators using this type of equipment should inspect all webbing tips for signs of peeling as soon as possible after receipt of this Notice, and thereafter at intervals of 350 flying hours or every month, whichever is the sooner.

NOTE : It is believed that in-service peeling is normally a gradual process but it may be aggravated by passengers. Therefore, engineering personnel should look for such peeling during cabin servicing.

4 All tips which have started to peel must be carefully trimmed and then rectified as soon as possible by either :—

(i) Replacing the left hand strap complete, or

(ii) Cutting off the damaged tip, forming a two inch radius on the end of the webbing as close to the original tip as possible, dipping the end into a suitable adhesive to a depth of approximately one inch, ensuring that there is not an excessive build-up on the faces of the strap and allowing the adhesive to dry until set and smooth.

NOTE : Recommended adhesives are :—

(a) Araldite MY 753 (to Spec. AFS 20A) with Hardner HY 956 (to Spec. AFS 122A).
(b) Evo-Stik Clear Adhesive.
(c) Samson C.203.
(d) Bostik 2762 (to Spec. DTD 900/4666).
(e) Bostik Clear Adhesive.
(f) Bostik 1755.
(g) Multi-Lok 241 — 2500.

5 Replacement straps can be obtained from, and re-tipping can be undertaken by, the manufacturer :—

RFD — GQ LTD., PORTUGAL ROAD, WOKING, SURREY.

6 **Cancellation** This Notice cancels ARB Notice No. 26, Issue 1, dated 20th October, 1964, which should be destroyed.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 27

Issue 7.

2nd November, 1970.

CONCORDE — INSPECTION ARRANGEMENTS

1 The prototype and pre-production Concorde aircraft are being produced jointly for the British and French Governments. In consequence, special inspection arrangements have been developed to satisfy the ARB, the Directorate of Quality Assurance, and the appropriate official French inspection authorities.

2 The inspection requirements for prototype and pre-production Concorde aircraft are defined in broad terms in a document known as TSS Standard No. 42. Since the contents of this document do not relate to aircraft intended for initial certification it has been withdrawn from the TSS Standards series. However, stocks are being maintained for use by those concerned with prototype and pre-production Concorde aircraft. Where amplification of the broad requirements in TSS Standard No. 42 has been found necessary, these are promulgated in a series of documents known as Concorde Inspection Requirements. The state of issue of these documents is as follows :—

TSS Standard No. 42, Issue 1, 1st July 1965.

Concorde Inspection Requirement No. 1, Issue 4, 10th August 1967.

Concorde Inspection Requirement No. 2, Issue 2, 8th July 1966.

Concorde Inspection Requirement No. 3, Issue 1, 1st February 1968.

3 Chief Inspectors of firms who are undertaking or expect to undertake sub-contract work on prototype and pre-production Concorde aircraft may obtain copies of the above documents on application to the Secretary, Air Registration Board, Technical Publications Department, Greville House, 37 Gratton Road, Cheltenham, Glos., GL50 2BN.

4 **Cancellation** This Notice cancels ARB Notice No. 27, Issue 6, dated 1st February 1968, which should be destroyed.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

AIRWORTHINESS NOTICE

No. 29

Issue 3.

22*nd August*, 1974.

AIRWORTHINESS DIVISION HEAD OFFICE

1 All concerned are asked to note the following details :—

TELEPHONE: REDHILL 65966
TELEX 27100
TELEGRAMS AND CABLES: BORDAIR, REDHILL.

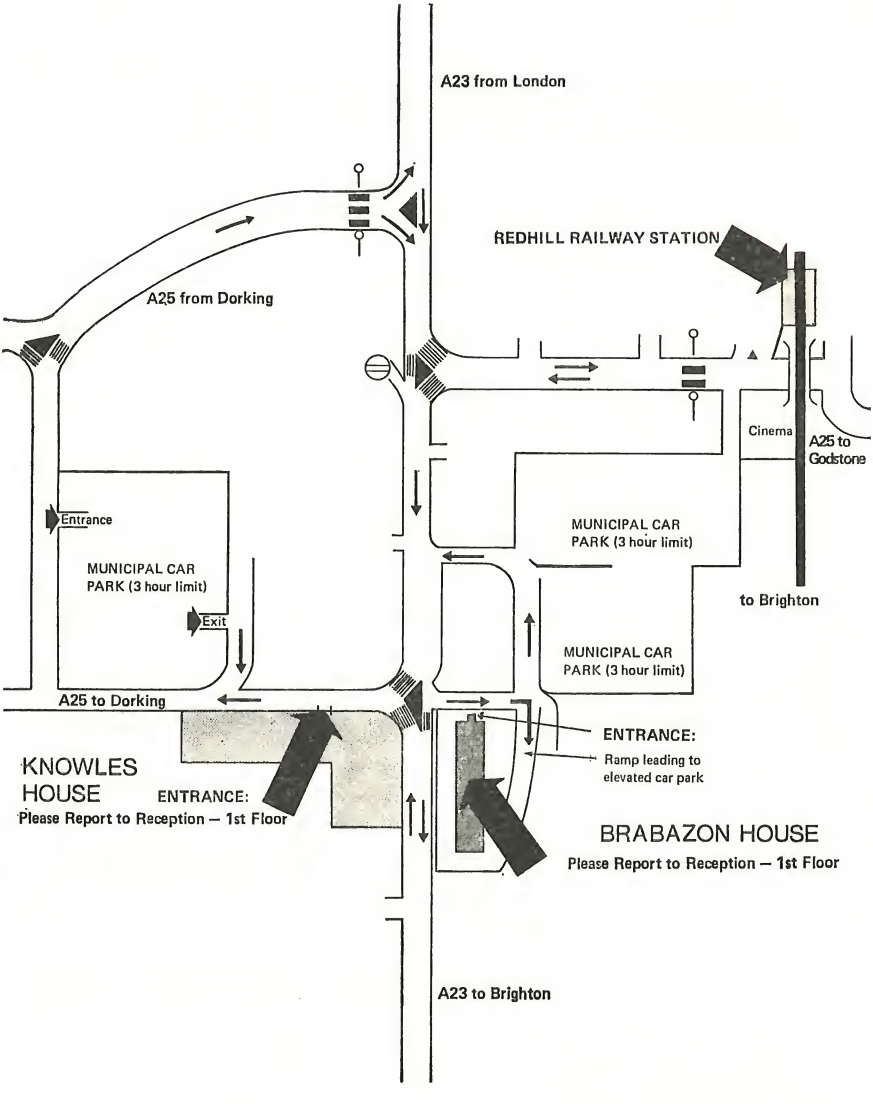
2 A drawing on the reverse of this Notice shows the location of Brabazon House and Knowles House. From this it will be noted that the buildings are situated close to the main London to Brighton road (A23) and to Redhill Railway Station which is on the main London to Brighton Line.

3 Parking space is provided at Brabazon House for Visitors.

4 **Cancellation** This Notice cancels ARB Notice No. 29, Issue 2, dated 1st February, 1966, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill,
Surrey RH1 1SQ.


A23 from London
REDHILL RAILWAY STATION
A25 from Dorking
Cinema
A25 to Godstone
Entrance
MUNICIPAL CAR PARK (3 hour limit)
Exit
MUNICIPAL CAR PARK (3 hour limit)
to Brighton
MUNICIPAL CAR PARK (3 hour limit)
A25 to Dorking
ENTRANCE:
Ramp leading to elevated car park
KNOWLES HOUSE
ENTRANCE:
Please Report to Reception – 1st Floor
BRABAZON HOUSE
Please Report to Reception – 1st Floor
A23 to Brighton

A. R. B. NOTICE

No. 30

Issue 1.

1*st May*, 1965.

HAND-HELD FIRE EXTINGUISHERS

1 Now that efficient hand-held fire extinguishers containing extinguishants having a much lower order of toxicity than methyl bromide or carbon tetrachloride are readily available, it has been decided by the Board, in conjunction with the Ministry of Aviation, to prohibit the use in aircraft of all hand-held fire extinguishers containing these fluids.

2 As soon as possible, but in any case not later than 30th September, 1965, all hand-held fire extinguishers containing methyl bromide or carbon tetrachloride fitted to aircraft must be replaced by suitable approved extinguishers.

By Order of the Board,

Secretary.

Air Registration Board,
Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 32

Issue 3.

1*st July*, 1968.

FRENCH TRANSLATION OF BRITISH CIVIL AIRWORTHINESS REQUIREMENTS

1 The arrangements for the investigation and certification of the Concorde supersonic aeroplane both in France and in the United Kingdom have necessitated a joint study of the existing Airworthiness Requirements of both countries. In order to facilitate the study of British Civil Airworthiness Requirements the ARB has undertaken the translation of a number of Sections of BCAR into French.

2 To date three Sections have been translated and may be obtained from the Secretary, Air Registration Board, Technical Publications Department, Greville House, 37 Gratton Road, Cheltenham, Glos., England. These are as follows :—

Section C — Engines and Propellers	£2 0s. 0d. (25 francs)
Section D — Aeroplanes	£4 0s. 0d. (49 francs)
Section J — Electrical	£1 0s. 0d. (13 francs)

3 It is also intended that a French translation of 'Section A — General Information and Procedure' will be made.

4 **Cancellation** This Notice cancels ARB Notice No. 32, Issue 2, dated 30th June, 1967, which should be destroyed.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 33

Issue 3.

1*st February*, 1972.

UNPROTECTED STARTER CIRCUITS IN AIRCRAFT NOT EXCEEDING 12500 lb

1 Minor fires have occurred in light aircraft due to starter motors burning out and electric cables becoming over-heated as a result of starter relay contacts jamming, a defect which may not be apparent prior to take-off.

2 When this Notice was first issued in 1949 the ARB required provision of a battery master switch which, although not eliminating a defect of this nature, enabled a pilot to isolate the battery and thereby reduce the risk of a serious fire.

3 Development of aircraft electrical systems has subsequently reduced the value of a battery master switch and led to the provision of alternative forms of protection.

4 The ARB recommends that the wiring of all aircraft up to and including a maximum authorised weight of 12500 lb be checked (if necessary, in conjunction with an engineer licensed in Category 'X' — Electrical) to ascertain whether failure of relay contacts to open on release of the cockpit starter switch may result in overheating of electrical cables and the starter motor.

5 Where such a hazard is found to exist, one of the following methods of protection is acceptable.

(i) Provision of a battery master switch or relay. This alternative alone is acceptable on simple aircraft which are able to continue safe flight and effect a landing without electrical power. A battery master switch should not be provided on aircraft with third brush generator systems unless special precautions are taken.

(ii) Provision of a manually operated starter isolation switch in series with the starter relay contacts.

(iii) Provision of two starter relays in series.

(iv) Provision of a warning light, or lights, to indicate to the pilot that take-off should not be attempted and that electrical power should be disconnected as the starter circuit is still energised.

(v) Any alternative method of protection, isolation or warning agreed by the ARB.

6 The inspection referred to in paragraph 4 is mandatory in respect of newly-registered aircraft and certificates of airworthiness will not be issued unless compliance with paragraph 5 has been established.

7 **Cancellation** This Notice cancels ARB Notice No. 33, Issue 2, dated 30th June, 1967, which should be destroyed.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 34

Issue 3.

2nd August, 1971.

AIR REGISTRATION BOARD—BUREAU VERITAS AGREEMENT

1 In France the Bureau Veritas performs certain duties in respect of the airworthiness of civil aircraft on behalf of the French Government. Subject to the provisions of this Notice the Bureau Veritas will perform similar duties in France on behalf of the Air Registration Board in respect of the supply of raw materials, manufactured or constructed aircraft or engine parts and maintenance and/or overhaul on aircraft or engines for which compliance with British Civil Airworthiness Requirements is specified.

NOTE : The ARB already acts in the United Kingdom in a similar manner on behalf of the Bureau Veritas.

2 The practice of administrating such work by ARB approval of the French firms in question has ceased and French firms holding ARB approval have been informed individually of the new arrangements.

3 New Procedure

3.1 Material or parts which conform with established British standards or design, or with original French design, which are to be obtained from French sources, and for which compliance with British Civil Airworthiness Requirements is necessary, must be acceptable to the Bureau Veritas. Maintenance or overhaul work on aircraft or engines must be similarly acceptable to Bureau Veritas. Accordingly, orders placed with any firm in France must bear a request for Bureau Veritas certification.

3.2 Two copies of the order must be sent to the Secretary, Air Registration Board, Brabazon House, Redhill, Surrey RH1 1SQ, simultaneously with the placing of the order in France, unless the ARB has agreed to an alternative arrangement for direct dispatch to the Bureau Veritas. The ARB will forward

one copy of the order to the Bureau Veritas with a request that it supervises the work. Bureau Veritas acceptance of the final products will be indicated by the issue of a Bureau Veritas 'Certificat de Contrôle'. Firm's release will be by 'Certificat de Conformité'.

NOTE : Certain Concorde products intended for assembly on aircraft in the UK will not be accompanied by a Bureau Veritas 'Certificat de Contrôle'. The firm's 'Certificat de Conformité' will be issued.

3.3 The order must quote or include all the appropriate standards and technical references, e.g. drawings, specifications, etc. Any queries in relation to the order will normally be settled by the Bureau Veritas and the French/British firms concerned. Any variation from the design, manufacturing or maintenance overhaul standards detailed on the order must have the prior agreement of the ARB. The ARB will collaborate with the Bureau Veritas and will notify the Bureau Veritas of any requirements extra to the order ('Special Conditions') with which it requires compliance.

3.4 It is intended that standard parts or stock parts will be subject to a somewhat simpler procedure when sufficiently detailed discussions with the Bureau Veritas have taken place.

4 The fees of the Bureau Veritas will, in principle, be chargeable to the French firms concerned.

5 The procedure described in this Notice is a general arrangement and does not apply to the supply of raw materials or to manufactured or constructed parts for prototype and pre-production Concorde aircraft, for which special provisions are made (see Notice No. 27).

6 **Cancellation** This notice cancels ARB Notice No. 34, Issue 2, dated 1st February, 1968, which should be destroyed.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

AIRWORTHINESS NOTICE

No. 35

Issue 5.

5th October, 1973.

LIGHT AIRCRAFT PISTON ENGINE OVERHAUL PERIODS

1 Normally, CAA will accept engine constructors' overhaul period recommendations which have been promulgated under a system approved by the responsible airworthiness authority, for engines installed in light aircraft, which in this context means:—

(a) all aircraft certificated in the General Purpose Category,
(b) all aircraft not exceeding 2730 kg certificated in the Special Category,
(c) all aircraft fitted with engines of 400 hp or less.

2 Some constructors' publications permit operation beyond the overhaul periods recommended, at the discretion of the owner/operator, if the condition of the engine shows it to be justified. In certain instances the recommended overhaul periods are associated with particular rates of engine utilization. This means that application of the recommendations is not always straightforward.

3 Following a review of the recommendations relating to engines used in UK registered light aircraft, this Notice details revised CAA policy.

3.1 Engines incorporating all the service bulletins/modifications which qualify the engine for the recommended overhaul period, may be operated to the hours between complete overhauls recommended by the constructor and promulgated under a system approved by the responsible airworthiness authority.

3.1.1 Engines which have not completed a recommended period which has a rate of utilization qualification, within eight years since first installation after the first build or the last complete or top * overhaul, may only continue in service to the end of the recommended period if the engine is inspected to a procedure, agreed by a CAA Area Office, at the completion of the eight years, and subsequently at 100 hour or yearly intervals, whichever occurs first, in order to assess its condition.

* "Top overhaul" means at least the restoration of cylinder and piston assemblies to complete overhaul standards.

3.1.2 Engines which have completed the recommended period, may continue in service for a further period of operation not exceeding 20% of the period recommended, subject to the engine being inspected to a procedure agreed by a CAA Area Office, in order to assess its condition immediately prior to the increase, and subsequently at 100 hour or yearly intervals, whichever occurs first, and subject to the extended period since installation after the first build or the last complete or top * overhaul not exceeding ten years.

3.2 The inspection procedure mentioned in paragraphs 3.1.1 and 3.1.2 is discussed in the Civil Aircraft Inspection Procedure Leaflet EL/3-15.

4 The inspections referred to in paras. 3.1.1 and 3.1.2, to assess the condition of engines installed in:—

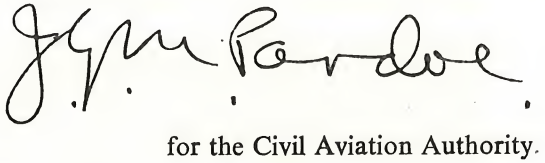
(a) aircraft maintained to a maintenance schedule, shall be made and certified by an appropriately licensed aircraft maintenance engineer, and

(b) aircraft not maintained to a maintenance schedule may be made by the operator but shall be made and certified by an appropriately licensed aircraft maintenance engineer at the next and each subsequent C of A renewal.

5 In no case shall any mandatory restrictions be exceeded, and the compliance with mandatory bulletins/modifications/ inspections shall be completed at the specified times.

6 In the case of engines not incorporating all the service bulletins/modifications which qualify the engine for the recommended overhaul period, or of engine types not included in the constructors' bulletins, a specific recommendation in writing must be sought from the constructor, and if this is not obtainable, application made to the CAA.

7 **Cancellation** This Notice cancels Airworthiness Notice No. 35, Issue 4, dated 25th September, 1972, which should be destroyed.



for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

* "Top overhaul" means at least the restoration of cylinder and piston assemblies to complete overhaul standards.

AIRWORTHINESS NOTICE

No. 36

Issue 6.

1*st February*, 1973.

MANDATORY MODIFICATIONS AND INSPECTIONS

1 **Definition** Mandatory modifications and inspections are those which must (on the authority of the CAA) be incorporated or enforced to ensure continued airworthiness. The method of classification in respect of British constructed aircraft is outlined in paragraph 2. For foreign constructed aircraft the CAA adopts the appropriate Foreign Airworthiness Directives as a basis and amends them or imposes additional requirements as necessary; details are given in paragraph 3.

NOTE: Where the term 'aircraft' is used in this Notice it includes engines, propellers, radio stations, accessories, instruments and equipment.

2 British Constructed Aircraft

2.1 Modifications and inspections are classified as mandatory by the CAA in consultation with the approved organisation concerned and, at the same time, the latest date for embodiment is decided.

2.2 In deciding dates of embodiment, the following are taken into account:—

(i) the degree of urgency,

(ii) the availability of modified parts and factors affecting their delivery, e.g. the number of aircraft concerned and their geographical location.

2.3 Wherever possible, the embodiment date is fixed to coincide with periodical inspections or overhauls so that the Operator has a reasonable amount of time for carrying out the work. In addition, consideration is given to the possibility of a special inspection procedure as, at least, a temporary alternative to the embodiment of the modification.

2.4 The initial notification of mandatory modifications and inspections is through the manufacturers' documents (e.g. Modifications Bulletins, Technical News Sheets) which are, where possible, distributed by the manufacturer to all operators of his aircraft and to all Airworthiness Authorities to whom those operators are responsible. In instances where the manufacturer no longer retains accurate records as to the ownership of his aircraft, the information on mandatory modifications and inspections is distributed by him to operators of his aircraft which are on the United Kingdom Register and to the Airworthiness Authorities of ICAO Contracting States together with any State in which his aircraft are known to be operating.

NOTE: In view of the notification procedure described in paragraph 2.4 owners, operators and organisations undertaking maintenance or overhaul should ensure that their names and addresses are known to the constructors of the aircraft for which they are responsible.

2.5 The manufacturers' bulletins include the latest date for the embodiment of the modifications, and CAA approval of the classification of the modifications is signified by a statement appearing on the individual bulletin in the following terms:— "This modification has been classified as mandatory by the Civil Aviation Authority."

2.6 The information referred to in paragraph 2.4 is summarised in the Mandatory Aircraft Modifications and Inspections Summary, issued by the CAA. This Summary is kept up to date by the issue of monthly supplements with consolidations at intervals of six months. Copies of the summary and amendments may be obtained from the CAA on payment of an annual subscription, details of which are given in Airworthiness Notice No. 6.

3 Foreign Constructed Aircraft

3.1 For aircraft constructed in the USA, Volumes I and II of the CAA publication Foreign Airworthiness Directives are applicable. These consist of Volumes I and II of the FAA Summary of Airworthiness Directives, together with CAA Additional Directives. FAA Supplements are supplied on a bi-weekly basis direct from the FAA. Amendments to the CAA Additional Directives are issued as necessary.

3.2 For aircraft constructed in foreign countries other than the USA, Volume III of the CAA publication Foreign Airworthiness Directives is applicable. Amendments are supplied on a monthly basis by the CAA.

3.3 Copies of Foreign Airworthiness Directives may be obtained from the CAA on prepayment of the fees detailed in Airworthiness Notice No. 6.

NOTES: (1) Foreign Airworthiness Directives in some instances refer to manufacturers' bulletins, etc., therefore owners, operators and organisations undertaking maintenance or overhaul should ensure that their names and addresses are known to constructors of the aircraft for which they are responsible.

(2) It is important that the latest issue of the Foreign Airworthiness Directives is obtained, and that any requirements additional to the previous issue are complied with.

4 **Cancellation** This Notice cancels Airworthiness Notice No. 36, Issue 5, dated 1st April, 1972.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

ARB NOTICE

No. 37

Issue 1.

16*th April*, 1968.

SERVICE BULLETINS AND INSPECTION AIDS SUMMARY

1 Service Bulletins

1.1 The Service Bulletin system is an integral part of the process of ensuring continuing airworthiness of an aircraft and the equipment with which it is fitted. In the case of United Kingdom manufactured aircraft the Service Bulletin is the primary document for advising owners or operators about modifications which have been made mandatory by the ARB (ARB Notice No. 36 refers).

1.2 There are indications, brought to light by recent ARB investigations of defects and incidents relating to light aircraft of foreign manufacture, that owners and operators may not be receiving the appropriate Service Bulletins.

1.3 It is of the utmost importance that owners or operators make arrangements to receive manufacturer's Service Bulletins regularly and that they take account of the advice which is contained in them.

1.4 It is the experience of the ARB that manufacturers are co-operative in the distribution of Service Bulletins but that efficient distribution depends upon the names and addresses of aircraft owners and operators being registered with the manufacturer and kept up-to-date. In certain cases a small charge may be made for this service.

2 Inspection Aids Summary

2.1 A document published by the United States Federal Aviation Administration, entitled 'General Aviation Inspection Aids Summary', contains useful information on defects and inspections of the smaller American aircraft, engines and

equipment. The usefulness of this document is not confined to owners and it should also prove invaluable to overhaul and maintenance organisations and Licensed Aircraft Engineers.

2.2 The Summary (Reference AC20-7C) is issued yearly for an annual subscription of $2.00 and is amended by a series of monthly supplements. It is available on order from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC, 20402.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

AIRWORTHINESS NOTICE

No. 38

Issue 2.

1*st December*, 1973.

MODIFICATION RECORD BOOK

1 British Civil Airworthiness Requirements, Chapter A6-9, contains details of the Modification Record Book which must be maintained for all aircraft of more than 2730 kg (6,000 lb) maximum authorised weight on the U.K. Register at 1st January, 1969.

2 The Modification Record Book is intended to be a statement of the modification history of the aircraft to which it relates and will record all modifications and major repairs made after 1st January, 1969, which affect the airworthiness of the aircraft. The format of the Book complies with the recommendations of the European Civil Aviation Conference (5th Plenary Session) which considered the transfer of "used" aircraft between Member States.

3 Copies of the Modification Record Book may be obtained from the CAA Printing and Publications Services, Greville House, 37 Gratton Road, Cheltenham, Glos., GL50 2BN, price £1·00 including packing and postage.

4 **Cancellation** This Notice cancels ARB Notice No. 38, Issue 1, dated 2nd December, 1968, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

AIRWORTHINESS NOTICE

No. 39

Issue 2.

1*st April*, 1972.

ELECTRONIC PARTS OF ASSESSED QUALITY WHICH COMPLY WITH BRITISH STANDARDS IN THE BS 9000 SERIES

1 Introduction

1.1 The British Standards Institution (BSI) has prepared a new range of Standards for electronic parts and is publishing these in the BS 9000 series. The new series will gradually replace certain defence (DEF) and electronic valve and semiconductor (CV and CN) Specifications and also some existing British Standards.

1.2 BS 9000 makes provision for the approval and supervision of manufacturers, test houses and distributors. The Electrical Quality Assurance Directorate of the Ministry of Defence (Procurement Executive) will be responsible for these aspects acting as an executive agent of the BSI.

2 Compliance with Airworthiness Requirements

2.1 So far as British civil aircraft are concerned, most of the manufacturing firms affected by the new Standards hold CAA Approval and it is not intended to withdraw or amend these approvals at the present time.

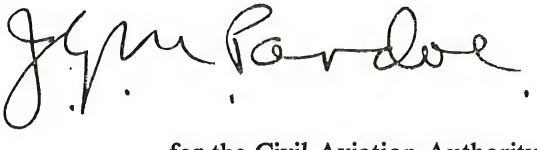
2.2 The selection of electronic components for any particular use in civil aircraft is normally the responsibility of a CAA Approved Organisation and the designer has freedom of choice, provided it can be shown that the completed equipment complies with British Civil Airworthiness Requirements.

2.3 The degree of control of specification and manufacturing and quality procedures required in respect of electronic components varies considerably according to the application and the integrity required of the complete equipment. It is the

responsibility of equipment designers to specify BS 9000 series components where it is deemed appropriate and in such cases they should agree in consultation with their Inspection and Purchasing Departments whether release by means of an CAA Approved Certificate is required, or whether a BS 9000 Certificate of Conformity may be accepted in place of a CAA Approved Certificate. Organisations carrying out maintenance and overhaul work may only accept such parts without an Approved Certificate provided they obtain the concurrence of the appropriate equipment design organisation.

2.4 There is also a limited range of manufactured products (e.g. manual and mechanically operated switches, connectors and small relays) which are covered by specifications within the BS 9000 series and which may be suitable, either for use as components within equipment or as items for direct fitting to aircraft in particular applications. Organisations considering the use of these items are reminded that it remains the responsibility of the appropriate Approved Organisation to establish the suitability of the design and the adequacy of the type test and other evidence of any given product for particular use in civil aircraft. In the case of items used in circuits or systems affecting the airworthiness of aircraft, the normal CAA equipment approval procedures will apply whether or not the product conforms to a BS 9000 series specification.

3 Cancellation This Notice cancels ARB Notice No. 39, Issue 1, dated 2nd June, 1969, which should be destroyed.



for the Civil Aviation Authority.

Civil Aviation Authority,
Airworthiness Division,
Brabazon House,
Redhill, Surrey.

ARB NOTICE

No. 41

Issue 5.

2nd November, 1970.

MAINTENANCE OF COCKPIT AND CABIN COMBUSTION TYPE HEATERS AND ASSOCIATED EXHAUST SYSTEMS

1 Introduction

1.1 The previous issues of this Notice referred to investigations of a fatal accident to a large transport aircraft which had revealed that the flight crew may have been suffering from carbon monoxide poisoning brought about by the gas escaping from combustion heaters or heater exhaust systems.

NOTE: Carbon monoxide (CO), a poisonous gas, is a product of incomplete combustion and is found in varying degrees in all smoke and fumes from burning carbonaceous substances. It is colourless, odourless and tasteless.

1.2 It is known that oversize nozzles have been fitted to some combustion heaters during service. This increases the concentration of carbon monoxide in the exhaust gases and causes operating difficulties with the heater.

1.3 It is imperative that only nozzles of the type quoted by the manufacturer are fitted and that servicing, overhaul and inspection standards of combustion heaters and heater exhaust systems are maintained at a high level.

2 Aircraft listed in ARB Notice No. 10, paragraphs 5.1 to 5.4.1, paragraph 7.3, Beechcraft aircraft listed in paragraphs 5.4.2 and 5.5, Aero Commander 680 FP and Cessna 421 aircraft.

2.1 The following requirements must be observed :—

(i) Heater overhaul periods must not exceed the manufacturers' recommendations.

(ii) At periods not exceeding two years :—

(a) The exhaust system must be completely dismantled and restored to a condition fit for a further period of use equivalent to the heater overhaul period.

(b) Combustion chambers must be pressure tested.

(c) The hot air outlet ducting adjacent to the heater must be inspected for evidence of exhaust contamination.

3 Aircraft other than those specified in paragraph 2

3.1 At intervals not exceeding two years the following action must be taken :—

(i) Overhaul the heater.

(ii) Fit new combustion chambers.

(iii) Completely dismantle the exhaust system and restore it to a condition fit for a further period of use equivalent to the heater overhaul period.

3.2 At half the overhaul period of the heater the combustion chambers must be pressure tested and the hot air outlet ducting adjacent to the heater must be inspected for evidence of exhaust contamination.

4 Maintenance Schedule Amendment Appropriate 'B' amendments must be submitted by all holders of ARB Approved Maintenance Schedules affected by these revised requirements.

5 Results of pressure tests conducted in accordance with the requirements of this Notice should be notified to the nearest ARB Area Office.

6 Proprietary carbon monoxide detectors are available. Whilst the use of such detectors may be an aid to the detection of carbon monoxide contamination in aircraft, their use is not considered to be a satisfactory substitute for the procedure detailed in this Notice.

7 Cancellation This Notice cancels ARB Notice No. 41, Issue 4, dated 2nd February, 1970, which should be destroyed.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

AIRWORTHINESS NOTICE

No. 42

Issue 3.

1*st April*, 1972.

TAILPLANE ATTACHMENTS IN TAYLORCRAFT PLUS D, AUSTER 3, 4, 5, 6, 6A & A.6I VARIANTS, AND J SERIES AIRCRAFT OTHER THAN J.I.U.

1 Introduction

1.1 A substantial number of flying hours has now been completed by aircraft on which the tailplane to fuselage attachment bolts have been turned through 90° (i.e. from vertical to horizontal). In no case has any cracking of the attachment stubs been found.

1.2 Although the modifications which alter the position of the attachment bolts are not mandatory, the CAA is satisfied that their embodiment can remove the necessity for the regular examination originally required. The inspection requirements of paragraph 2 are written with this in mind.

2 Tailplane Attachment Fuselage Front Stubs

2.1 All Auster J.5.F. Aiglet Trainers are to be inspected at periods not exceeding each 100 hours' flying for signs of failure of the tailplane attachment stubs, except that this inspection need not be carried out if Modifications Nos. 3252, 2555 and 3234 are embodied.

2.2 All Taylorcraft Plus D and Auster variants other than J.5.F., are to be inspected at periods not exceeding each 300 hours' flying for signs of failure of the tailplane attachment stubs, except that this inspection need not be carried out if Modifications Nos. 3252 or 3413, together with 2555 and 3234 are embodied.

NOTE: For ease of reference the descriptions of the relevant modifications are as follows :—

2555	Safety tube installed in front tailplane attachment stubs.
3234	Split pin to retain safety tube in position.
3252 or 3413	Tailplane to fuselage attachment bolts turned to the horizontal position.

3 **Tailplane Leading Edge Tube** Tailplane front attachments must be inspected for signs of fracture of the leading edge tube in the vicinity of the saddle washers. After inspection the serial numbers of the tailplanes fitted to the aircraft and the date of the inspection must be entered in the aircraft log book, and the entry must also indicate whether the saddle washers are brazed or welded to the leading edge tube.

3.1 If the saddle washers are found to be brazed, the inspection must be repeated at periods not exceeding each 300 hours' flying.

3.2 If the saddle washers are found to be welded, subsequent inspection as indicated in paragraph 3.1 will not be necessary, neither is this inspection necessary on aircraft having Modification No. 3252 or 3413 embodied, as saddle washers on these tailplanes are of the welded type.

NOTE: Recommended methods of crack detection are given in the appropriate Leaflets of Section BL/8, Non-destructive Examinations, of Civil Aircraft Inspection Procedures.

4 **Notification** The presence of any cracks in the fuselage tailplane attachment stubs must be reported to R. F. Saywell Ltd., London (Gatwick) Airport, Horley, Surrey, indicating whether Modification No. 3252 or 3413 has been incorporated.

5 **Cancellation** This Notice cancels ARB Notice No. 42, Issue 2, dated 2nd November, 1970, which should be destroyed.

for the Civil Aviation Authority.

Civil Aviation Authority,
Airworthiness Division,
Brabazon House,
Redhill, Surrey.

ARB NOTICE

No. 43

Issue 1.

1*st August*, 1969.

TYPE CERTIFICATES

1 **Introduction** The approval by ARB of the design of certain types of aircraft is signified by the issue of a Type Certificate. This procedure is described in the British Civil Airworthiness Requirements Chapter A2-7.

NOTE: Type Certificates are also issued for engines, and in this case are described as 'Engine Type Certificates'. The description 'Type Certificate' is applied only to Type Certificates for aircraft.

2 **Applicability** Aircraft which meet one of the following conditions are subject to Type Certificate procedure :—

(i) Aircraft of British design being a new type of which no variant has been certificated in other than the Special Category prior to 1st January, 1968.

(ii) Aircraft of foreign design having a maximum authorised weight greater than 6000 lb and being a new type of which no variant has been certificated in other than the Special Category in the United Kingdom prior to 1st January, 1968.

NOTE: In the case of a British design, the definition of what constitutes a 'new type' will be at the discretion of ARB. For a foreign design, the criterion applied by the competent foreign authority will usually be accepted — that is a design will not be considered 'new' if it is covered by the same foreign Type Certificate Data Sheet as another variant which was accepted by ARB prior to 1st January, 1968.

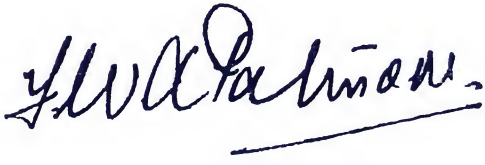
3 **Documentation** Associated with each Type Certificate are Data Sheets which give the basis of certification and some technical details. The layout of the Data Sheets is in accordance with the recommendations of the Fifth Session of the European Civil Aviation Conference (ECAC).

4 **Issue and Amendment** Type Certificate Data Sheets are published by the ARB in a suitable binder. The Type Certificate Number and the aircraft type variants covered are shown in the contents list. Changes to the Data Sheets including the addition of new variants will be made by a re-issue of the Data Sheets showing the date of approval. Material differences between issues will be indicated by marginal lines.

4.1 One copy of the publication is issued free of charge to all Airworthiness Authorities under the terms of ARB Notice No. 22.

4.2 Copies may be purchased by payment of an annual subscription of £2 0s. 0d. which includes the binder, foreword, index and all new and amended Data Sheets to be issued during the subscription year. Applications for copies under this scheme should be addressed to the ARB Technical Publications Department, Greville House, 37 Gratton Road, Cheltenham, Glos., accompanied by the appropriate remittance or official order.

By Order of the Air Registration Board,



Secretary.

Brabazon House,
Redhill,
Surrey.

AIRWORTHINESS NOTICE

No. 44

Issue 4.

16*th April*, 1974.

GAS TURBINE ENGINE PARTS SUBJECT TO RETIREMENT OR ULTIMATE (SCRAP) LIVES

1 The design of gas turbine engines in service is such that certain critical parts, notably compressor and turbine discs, experience cyclic variations of stress as a result of mechanical and thermal effects which are of sufficient magnitude to result in fatigue damage. The failure of these parts can result in damage to the aircraft since under operating conditions they may possess more energy than can be absorbed by the surrounding engine structure. It is therefore necessary to limit the life of all critical parts in order to prevent fatigue damage developing into complete failure. As fatigue damage is not detectable by current inspection techniques until cracking has begun, and because crack propagation to the point of failure can be unacceptably rapid, a safe life for each critical part will have been established and approved as part of the certification procedure.

2 These safe lives, also referred to as retirement lives, ultimate lives, scrap lives and low cycle fatigue (LCF) lives, are mandatory limits which must never be exceeded. They are required by BCAR Section A, Chapter A6-2, to be published for UK constructed engines, in the Engine Manuals. Constructors also publish this information variously in Service Bulletins, Service Memoranda, Notices to Operators, Maintenance Manuals, etc., for the benefit of operators and engine overhaul agencies. It may be possible to extend the published lives as a result of further testing, and this is normally indicated in the publications as an aid to spares provisioning, but such amendments must be approved.

3 The Inspection and Test Certificate of an engine issued by a constructor or overhaul agency is required to include reference to a certified statement in which is recorded the life consumed, up to the time of release, by each of the life-limited parts fitted in the engine. This statement is normally included in the engine log book, but may be included in any other document which has been approved as an alternative for a particular operator.

4 Each operator is responsible for ensuring that parts fitted to the engines being operated do not exceed the published lives. Therefore accurate up-to-date records of the life consumed by each engine are required to be maintained, and this may involve recording flying hours, number of landings, 'touch and go' landings and take-offs, air re-starts, etc., dependent upon each constructor's definition of a unit of life. In order to preserve continuity of the records, an up-to-date statement of the life consumed since last release must accompany each engine when despatched by an operator to an overhaul agency for repair, modification and partial or complete overhaul.

5 When a new type of aircraft fitted with a UK constructed turbine engine is first introduced into service the operator is responsible for determining a 'typical flight cycle', described in engine terms, applicable to its operation. This should be done by sufficient monitoring of service flights, and as necessary training flights, to provide an adequate knowledge of actual engine flight profiles. If these appear to be in any way more severe than those assumed by the engine constructor, the operator shall inform the engine constructor and the CAA. Amended approved lives will be published if necessary.

NOTES : (1) As differences between winter and summer operation, and differences in the installed position of engines in the aircraft may make significant difference to the usage experienced, these factors should be taken into account in the monitoring programmes. Also because auto-throttle and auto-land systems can affect the envelope of engine speeds used, it is important that any changes to the characteristics of such systems are assessed.

(2) Section A, Chapter A6-2 of BCAR now requires the engine constructor to publish, in the engine manuals, information concerning the engine flight profile assumed for the establishment of safe lives.

6 Each operator of an aircraft type (fitted with a UK engine) which he has not previously operated shall, during the first six months of operation, establish that his engines are being used within the flight profile published by the engine constructor. If there is any reason to believe that the flight cyclic fatigue usage may be more adverse than currently assumed, the operator shall inform the engine constructor and the CAA with a view to revision of the approved lives.

7 The CAA will, from time to time, review with UK engine constructors the total experience applicable to any engine/aircraft type. When this reaches a level at which the engine operation can be regarded as well established, the need for compliance with paragraph 6 will cease, and this will be stated in the engine constructors manual material dealing with this subject.

8 Additionally, all operators of UK constructed engines will be required at yearly intervals to make a formal statement that :—

(a) in respect of engines having been assessed under paragraph 6, there has been no change to their operation, engine handling, auto-throttle systems, thrust reverse drills, etc. —

(b) in respect of engines covered by paragraph 7, they are permitting no procedures which would result in their engines operating outside the prescribed flight profile to an extent —

which could significantly affect fatigue life usage, unless an assessment by the engine constructor has shown any effect to be unimportant or allowed for by appropriate adjustment of lives.

9 Operators of engines constructed outside the UK may find that the engine constructors' manuals contain different information on this subject from that in manuals for UK engines. Operators must obviously comply with any instruction given, but are additionally advised to inform the engine constructor of any conditions of their operation which may be at variance with his instructions. The CAA will provide assistance if desired in obtaining the constructors assessment of the effects of operations on related lives.

10 **Cancellation** This Notice cancels Airworthiness Notice No. 44, Issue 3, dated 25th September, 1972, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey, RH1 1SQ.

ARB NOTICE

No. 45

Issue 1.

18*th February*, 1970.

AIRCRAFT RADIO MAINTENANCE ENGINEERS' LICENCES

1 The transfer of responsibility for examinations and for the issue of licences in respect of Aircraft Radio Engineers from the Board of Trade to the ARB will take effect on 1st May, 1970. In the meantime Radio Engineers should continue to make application to the Board of Trade for the grant, extension and renewal of their licences. They need take no additional action at present other than that outlined in paragraph 2.1.

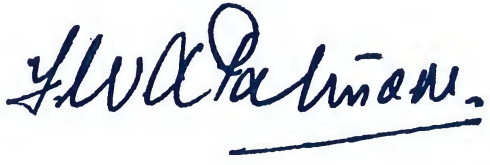
2 When the responsibilities are transferred the licence will be known as the Aircraft Maintenance Engineer's Licence Category 'R' — Radio. This category will be divided into three ratings, namely: airborne communications systems, airborne navigation systems and airborne pulse and FM systems. Examinations may be taken progressively or at one attempt.

2.1 The practical examination previously conducted by the Board of Trade will not apply to Category 'R'. Applicants will be required to complete a Schedule of Work (ARB Form 301), which should cover actual experience of the installation, maintenance, modification or repair of equipment in the particular rating. Engineers affected are advised to commence recording any relevant work immediately so that after the date of transfer they will be able to present Schedules to the ARB when applying for the grant or extension of a licence.

2.2 Candidates for grant or extension of licences in Category 'R' will be required to reach a satisfactory standard in written and oral examinations on the subjects applicable to the ratings for which they are accepted.

2.3 Engineers already holding Aircraft Radio Maintenance Engineers' Licences will be issued with Aircraft Maintenance Engineers' Licences in Category 'R'—Radio, upon application to the ARB at the date when the original licence becomes due for renewal. The ratings in the new licence will relate to those in the licence already held.

By Order of the Air Registration Board.



Secretary.

Brabazon House,
Redhill,
Surrey.

A. R. B. NOTICE

No. 46

Issue 1.
1*st February*, 1966.

A.R.B. APPROVALS COMPENDIUM

1 A Compendium has been prepared to give information on the Board's requirements and the associated general procedure necessary to obtain and maintain A.R.B. approval. The information consists of a selection from various A.R.B. publications and is contained in a folder under the title "A.R.B. Approvals Compendium".

2 The information reflects the Board's latest requirements and is intended to replace A.R.B. Handbooks No. 3, "Inspection and Design Approval of Firms under The Air Navigation Order", and No. 4, "Approval of Inspection Organisations and the Maintenance of Airworthiness", which are out of print. All copies of existing A.R.B. Handbooks Nos. 3 and 4 should be destroyed.

3 One copy of the Compendium will be supplied, on a complimentary basis, to firms holding A.R.B. approval and to firms who have applied for approval. Amendments will be supplied, also on a complimentary basis, whenever any of the relevant publications are amended. Additional copies and amendments may be obtained from the Board on repayment and details will be supplied on request to the Secretary, Air Registration Board, Technical Publications Department, Greville House, 37 Gratton Road, Cheltenham, Glos.

By Order of the Board,

F. W. Dalmeny

Secretary.

Air Registration Board,
Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 47

Issue 1.

18*th February*, 1970.

AIRCRAFT, ENGINE AND PROPELLER LOG BOOKS

1 The Air Navigation (Fifth Amendment) Order 1970 revises the provisions of Article 83(1) of the Air Navigation Order 1966 by introducing a definition of the term 'log book'. This definition permits the use of a record other than the log books prescribed in Article 12 of the Order in respect of aircraft, engine and variable pitch propellers.

2 The means of recording used must be approved by ARB and can include a technical records system or computer records.

3 Owners or operators of aircraft who wish to use such alternative means of recording should submit details to the nearest ARB Office for consideration.

4 Subsequent approval of an alternative system will be notified in writing by ARB.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 48

Issue 1.

8th April, 1970.

AIRWORTHINESS FLIGHT TESTS

1 British Civil Airworthiness Requirements (Chapter A5-2) require flight tests to be undertaken to ensure that the flight characteristics and the functioning in flight of any aircraft do not differ significantly from those acceptable to the ARB in respect of the aircraft type. The tests are required annually, or at such other intervals as may be agreed by the ARB.

2 Aircraft are required to be tested in accordance with Airworthiness Flight Test Schedules published by the ARB for aircraft types or in accordance with Test Schedules approved by the ARB, which contain as a minimum, all the tests in the Airworthiness Flight Test Schedules.

3 Airworthiness Flight Test Schedules are re-issued from time to time and it is an operator's responsibility to ensure that his aircraft are tested in accordance with the current issue of the appropriate Schedule. Immediately before each test flight, reference should be made to the local ARB Office to ensure that the current Schedule is used.

4 Airworthiness Flight Test Schedules are not normally available from the ARB Technical Publications Department. In cases of difficulty copies of Schedules will be supplied, together with a reminder of paragraph 3 above.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

A. R. B. NOTICE

No. 49

Issue 1.

1*st February*, 1966.

MANUFACTURE AND INSPECTION OF AIRCRAFT PARTS AND APPROVAL OF MATERIALS FOR THE REPAIR OR OVERHAUL OF AIRCRAFT

1 The attention of all concerned is again drawn to the fact that cases have occurred and still occur where :—

1.1 Defective parts have been replaced by parts manufactured without reference to drawings, the defective part being used as a pattern, or

1.2 Components for which no certificate of compliance could be produced have been embodied in civil aircraft. In some cases parts had been obtained from stocks which were surplus to the requirements of the Services, or from various sources other than the manufacturer.

2 In circumstances such as those referred to in paragraph 1.1, there is considerable risk of the new part being made to incorrect dimensions and/or of incorrect materials.

3 In every case where it is necessary to manufacture any detail or component of an aircraft for which a certificate of airworthiness has been issued or is to be issued or renewed, such replacements must be manufactured, inspected and installed to approved drawings.

4 Certification of any repair or replacement under the requirements of Chapter A4—3 of British Civil Airworthiness Requirements, should not be made unless either :—

4.1 The replacement part has been approved by the manufacturers of the aircraft, or

4.2 The part has been manufactured and inspected to standard approved drawings (approved repair schemes issued by certain manufacturers coming under this heading), or

4.3 The repair has been approved as a modification subsequent to the issue of a certificate of airworthiness.

5 The existence of an inspection stamp is not in itself sufficient evidence of approval of materials, details or components ; approved certificates are also required, and these documents should be held available for examination when an aircraft is inspected for the issue or renewal of a certificate of airworthiness.

6 **Cancellation** This Notice cancels Notice to Licensed Aircraft Engineers and to Owners of Civil Aircraft No. 49, Issue 2, dated 15th August, 1960, which should be destroyed.

By Order of the Board,

Secretary.

Air Registration Board,
Brabazon House,
Redhill,
Surrey.

A. R. B. NOTICE

No. 50

Issue 1.

1*st May*, 1966.

DETERIORATION OF WOODEN AIRCRAFT STRUCTURES

1 In 1957 the Board issued a Notice regarding the deterioration of timber and glued joints in aircraft and warned that extensive dismantling and inspection might be required before the renewal of Certificates of Airworthiness.

2 More recent examinations of wooden aircraft structures have continued to disclose serious deterioration, much of which is due to water soakage.

3 In most cases the deterioration has occurred in places where normal inspection is impossible and has not come to light until the adjacent structure has been disturbed to embody repairs or modifications, or during extensive overhaul. This closer examination has revealed failure of glued joints in the primary structure and patches of timber in an advanced state of decay.

4 Because the external appearance of wooden aircraft gives little or no indication of the condition of the timber and glued joints beneath the surface, the Board's Surveyors will, before renewing Certificates of Airworthiness, require evidence to show that such aircraft have been dismantled, opened up and the upholstery removed to such an extent as to ensure that all timber and glued joints have been inspected and, if found to be defective, made good. This will apply to all wooden aircraft whether or not maintained to an approved maintenance schedule.

5 Wooden aircraft left continuously in the open are particularly susceptible to this kind of deterioration which can occur within a period of a few months. The type of storage provided for the aircraft will therefore be taken into consideration by the Board's Surveyors when assessing the amount of inspection necessary to meet the requirements of paragraph 4 above.

6 **Cancellation** This Notice cancels Notice to Licensed Aircraft Engineers and to Owners of Civil Aircraft No. 50, Issue 1, dated 18th September, 1957, which should be destroyed.

By Order of the Board,

Secretary.

Air Registration Board,
Brabazon House,
Redhill,
Surrey.

A. R. B. NOTICE

No. 52

Issue 1.

1*st February*, 1966.

FUSE LINKS

1 A recent investigation has shown that a fuse link type 'F' (Ref. No. 5C/ or 5CZ/878) was incorrectly used in an aircraft electrical circuit instead of a fuse link type 'M' (Ref. No. 5C/ or 5CZ/1667). It is believed that this error occurred due to incomplete marking of the fuse link rating.

2 These fuse links are of the glass tube square end cap type and are manufactured in accordance with Ministry of Aviation specification E. & I. 496 and the associated drawing E. & I. 7434. The type 'F' has a nominal rating of 60 amps intermittent and the type 'M' of 60 amps continuous. Both types are now obsolescent and their main use is in older types of aircraft.

3 The rating, type and reference number is clearly marked on the end caps of each fuse link. The correct rating mark for the type 'F' is "60 INT" and the mark for the type 'M' is "60". It is known that a significant quantity of type 'F' exist with the letters "INT" omitted from the rating mark.

4 As an immediate precaution, the following action must be taken on aircraft using type 'F' and/or 'M' fuse links:—

(i) Remove from aircraft all type 'F' links bearing the rating mark "60" instead of "60 INT" whether such links are installed in circuits or carried as spares.

(ii) Ensure that each circuit using type 'F' or 'M' links is fused with a link of the correct type and reference number and that spares to comply with the Air Navigation Order are provided.

5 As from the date of this Notice, Certificates of Airworthiness will not be issued or renewed and Certificates of Maintenance should not be signed until the action required by paragraph 4 has been completed.

6 No attempt should be made to salvage inadequately marked type 'F' fuse links by merely adding the letters "INT" as such links are almost certainly of considerable age and may well have deteriorated.

7 Certain publications suggest the use of type 'R' fuse links of appropriate rating as replacements for the fuse links to specification E. & I. 496. The Board does not recommend this practice as end caps of type 'R' links are of circular cross section and their use may result in inferior electrical and mechanical contact.

8 If existing stocks of type 'F' or 'M' fuse links are inadequate or their serviceability is suspect, new production supplies may be obtained from:—

Kenneth E. Beswick Limited,
Alert Works,
Frome,
Somerset.

By Order of the Board,

Secretary.

Air Registration Board,
Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 53

Issue 1.

26th June, 1970.

VERTICAL SPEED INDICATORS ON IMPORTED AIRCRAFT

1 Introduction

1.1 A recent incident on an imported light aircraft has shown the possible danger of the presentation of false information to the pilot due to reversed indication by the vertical speed indicator during a fast rate of descent.

1.2 United Kingdom approved instruments and instruments complying with the United States TSO Specification C8b are fitted with stops to prevent such occurrence. It is not known whether other instruments, particularly those likely to be installed in imported aircraft of less than 12500 lb maximum weight are similarly equipped.

2 Action

2.1 Before issue or renewal of the Certificate of Airworthiness of an imported aircraft, it shall be established whether the vertical speed indicator is fitted with limit stops. This may be done by test or reference to the manufacturer.

2.2 If stops are not fitted, either the vertical speed indicator shall be replaced by an instrument that has stops, or alternatively the placard defined in paragraph 3 shall be fitted.

3 Placard

3.1 The following placard shall be fitted adjacent to a vertical speed indicator not fitted with stops :—
'This indicator is not fitted with limit stops and a rate of change of altitude in excess of the maximum calibration will cause indication in the reverse sense.'

3.2 The placard may, as a temporary measure, be typewritten on white card, but shall be replaced by a more permanent placard as soon as possible.

4 **Record** A record of the action taken to comply with paragraph 2 above shall be made in the aircraft log book, quoting the serial number of the instrument.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 54

Issue 1.

26th June, 1970.

INSTRUMENTS WITH UNUSUAL PRESENTATIONS

1 From time to time on imported aircraft, especially those of less than 12500 lb maximum weight, instruments are found which have unusual presentations. Whether these instruments are fitted in order to meet mandatory requirements or as extras, they must not be capable of misleading a pilot conversant only with conventional presentations.

2 An ARB evaluation of any such instrument is required for United Kingdom certification of any imported aircraft to which it is fitted, or if it is introduced by modification action. This evaluation will include a review of the actual presentation of the instrument and its position with respect to other instruments in the panel. It will also include flight tests if necessary.

3 Enquiry to ARB Head Office will determine whether or not any such instrument has already been investigated and whether it is accepted for a mandatory or non-mandatory role.

4 Typically, a placard will be required adjacent to any such instrument giving warning of its presentation and stating 'unapproved' if it is fitted only as an extra and is not acceptable in fulfilment of a mandatory requirement.

NOTE: The placard must not be easily erased, disfigured or obscured.

5 The log book of any aircraft in which such an instrument is fitted and accepted should record the type of instrument and the reference for the acceptance, unless this is covered in the Flight Manual or Type Certification documents.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

AIRWORTHINESS NOTICE

No. 55

Issue 2.

5th October, 1973.

ROUTINE MAINTENANCE OF PROPELLER BLADES

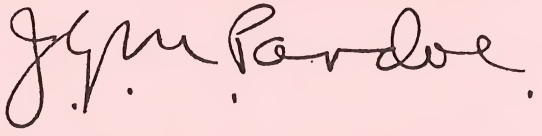
1 Instances have occurred where propeller blade tips have been lost in flight because of fatigue cracks resulting from improper maintenance. Investigation has revealed that these cracks occurred because blade damage such as nicks, dents, gouges and corrosion had not received the recommended attention.

2 Propeller constructors clearly define, in the appropriate manuals, blade damage which need not be re-worked until the next overhaul. Any blade damage exceeding such limitations must be re-worked, in accordance with the constructor's recommendations, prior to the next flight. Any evidence of corrosion must be treated in accordance with the manufacturer's recommendations.

3 The consequences of not re-working gross blade damage, or neglecting the presence of surface corrosion, are such that airworthiness is impaired. The presence of corrosion, nicks and dents will produce undesirable stress concentrations which under continuous operating conditions can and will cause blade failure. Furthermore, it must be borne in mind that all assessments of the airworthiness of propellers from the fatigue aspect have been made assuming that the blades will be properly maintained.

4 Certificates of Airworthiness will not be issued or renewed, and Licensed Aircraft Engineers should not sign Certificates of Maintenance or Release, where it is noted that propeller blade maintenance has been inadequate. In addition, CAA Surveyors may recommend the cancellation of the Certificate of Airworthiness or a reduction in the period between overhauls if, in their opinion, the condition of a propeller indicates inadequate maintenance.

5 **Cancellation** This Notice cancels ARB Notice No. 55, Issue 1, dated 1st December, 1966, which should be destroyed.



for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

A. R. B. NOTICE

No. 56

Issue 1.

1*st January*, 1967.

THE MAINTENANCE OF AIRCRAFT USED FOR AGRICULTURAL SPRAYING PURPOSES

1 Because of the highly corrosive effect of certain chemicals now in common use for aerial crop spraying and dusting, attention is drawn to the need for special care in the maintenance of aircraft used for this purpose.

2 The Board of Trade and the A.R.B. have decided that in respect of aircraft used for public transport duties, as well as for agricultural work, the approved maintenance schedules must include the additional maintenance which is necessary before public transport duties are re-commenced following a period of agricultural flying. These additional maintenance checks will be mandatory and must be undertaken irrespective of the fact that the aircraft may not be due for inspection against the normal basic check cycle.

3 The Board of Trade have agreed that Certificates of Airworthiness of aircraft currently on the United Kingdom Register and engaged on agricultural operations may not be renewed unless evidence is available that maintenance has been carried out in accordance with the above-mentioned requirements.

4 The general Requirements for maintenance schedules and the approval thereof are prescribed in British Civil Airworthiness Requirements, Section A, Chapter A6—4.

5 **Cancellation** This Notice cancels Notice to Licensed Aircraft Engineers and to Owners of Civil Aircraft No. 56, Issue 2, dated 15th August, 1960, which should be destroyed.

By Order of the Board,

Secretary.

Air Registration Board,
Brabazon House,
Redhill,
Surrey.

A. R. B. NOTICE

No. 57

Issue 1.
1*st May*, 1966.

PARTS OF UNQUALIFIED ORIGIN

1 From time to time sales are arranged to dispose of surplus, obsolescent, obsolete, defective or scrap aircraft material, parts and components, either new or used. It is usual for the material, parts and components to be offered for sale "as lying". Ideally, the vendor should qualify his sale notice with a waiver in respect of any responsibility for the integrity of the items concerned, and it would certainly be improper for them to be sold with any suggestion or implication that they might be suitable for use on aircraft.

2 All concerned are reminded that, in accordance with British Civil Airworthiness Requirements, such material, parts and components are only acceptable for installation in civil aircraft provided an appropriately A R B Approved Organisation ensures that the items have been :—

(i) Checked for compliance with the manufacturers' applicable specification.

(ii) Overhauled in accordance with the manufacturers' overhaul manual.

(iii) Re-certified under cover of an A R B Approved Certificate.

By Order of the Board,

F. W. Dalwell

Secretary.

Air Registration Board,
Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 58

Issue 2.

1*st December*, 1971.

FLAME RESISTANT FURNISHING MATERIALS

1 It is important to ensure that the materials used when carrying out repairs or modifications to aircraft cabin furnishings have suitable flame resistant properties. The materials should either meet UK Requirements or be at least equal to those of the materials used in the original design, as accepted for UK certification.

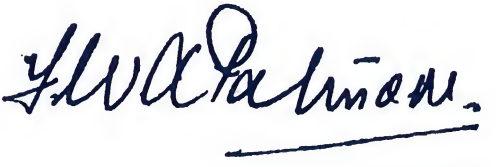
2 The detailed requirements for compartment design safety precautions for aircraft designed in the United Kingdom are prescribed in British Civil Airworthiness Requirements (BCAR) Chapters D4-3 and K4-3. Suitable methods for flame resistance testing of aircraft furnishing materials are described in Civil Aircraft Inspection Procedures (CAIP) Leaflet BL/10-2.

3 Some imported foreign constructed aircraft are accepted for UK certification as complying with the airworthiness standards of the country of manufacture. Although not necessarily identical to BCAR, these standards are considered to provide an acceptable level of safety in relation to the particular aircraft types.

4 If flame resistant properties can be destroyed by dry cleaning or laundering processes, the materials should be reproofed after cleaning. As suitable materials are becoming increasingly available, it is recommended that inherently flame resistant materials be used in preference to materials not permanently so treated.

5 **Cancellation** This Notice cancels ARB Notice No. 58, Issue 1, dated 20th January, 1971, which should be destroyed.

By Order of the Air Registration Board,



Secretary.

Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 59

Issue 2.

1*st April*, 1971.

AIRCRAFT EQUIPMENT

1 The attention of all concerned is drawn to the fact that Schedule 5 of the Air Navigation Order, 1970, lists additional equipment which must be installed according to the circumstances in which an aircraft is to be flown.

2 It is the responsibility of the operator to ensure that the appropriate equipment is installed in relation to the type of flight to be undertaken, and the existence of a valid Certificate of Airworthiness does not necessarily mean that such mandatory equipment, as laid down for particular purposes in Schedule 5 of the Air Navigation Order, 1970, is installed.

3 **Cancellation** This Notice cancels ARB Notice No. 59, Issue 1, dated 23rd March, 1967, which should be destroyed.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 60

Issue 1.

20*th January*, 1971.

WOODWARD PROPELLER GOVERNORS

1 An Airworthiness Directive No. 70-26-2 issued by the Federal Aviation Administration applies to Woodward propeller governors models 210452, A210452, B210452, C210452, D210452, E210452, F210452, G210452, H210452, J210452, K210452, L210452, M210452, P210452, 210453, 210458, 210460, B210460, 210462, A210462, 210472 and C210472, having serial numbers below 992601 which were manufactured prior to 1970.

2 Compliance with the inspection and rectification specified in the Airworthiness Directive is required within the next 50 hours flying after the date of this Notice.

3 A copy of the Airworthiness Directive No. 70-26-2 may be seen at any ARB Office.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

A. R. B. NOTICE

No. 61

Issue 1.

1*st May*, 1966.

BRITISH CIVIL AIRWORTHINESS REQUIREMENTS —METHOD OF PURCHASING

1 At present, when new issues of Sections of British Civil Airworthiness Requirements are made, their availability is announced in a number of ways—in A.R.B. Notices, in the Aeronautical Press and by circular letter to holders of B.C.A.R. whose names are included in the mailing list. Those requiring the new issue can then order as necessary. This system was devised at a time when all Sections were bound and were re-issued complete whenever revisions were made.

2 Certain Sections are now being issued in a folder in loose chapter form so that it is not necessary to re-issue the whole Section when changes are made. Thus revisions can be issued soon after they have been agreed and do not have to await the collection of sufficient material to warrant re-issue of the whole Section. This has resulted in more frequent issues of amendments.

3 The Board also makes available "Blue Papers" which contain forewarning of amendments to the Requirements and show revisions which have been agreed with the Industry through the Board's Co-ordinating Committees. These papers are punched in such a way as to fit into the B.C.A.R. folder.

4 In present circumstances the process of notifying the availability of amendments and awaiting orders is proving inconvenient to the majority of holders of B.C.A.R., and a new scheme is therefore to be introduced. In the new scheme a list of holders of B.C.A.R. will be maintained by the Board and an annual subscription charged for a service whereby all Blue Papers and amendments to B.C.A.R. will be supplied to those on the distribution list. The charge for this service will be £3 0s. 0d. per annum. However, in cases where Blue Papers are not required, the subscription will be £1 10s. 0d. per annum for printed amendments only.

5 All persons wishing to avail themselves of this service, which will come into effect on 1st November, 1966, including those at present on the Board's "notification" distribution list, should apply to the Secretary, Air Registration Board, Technical Publications Department, Greville House, 37 Gratton Road, Cheltenham, Glos., stating which subscription rate is preferred and the number of copies required. No money should be sent at this stage.

6 As in the past, complete sets of B.C.A.R. or individual Sections may be purchased at any time without the necessity to be included on the "subscription" distribution list.

By Order of the Board,

Secretary.

Air Registration Board,
Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 62

Issue 2.

1*st April*, 1969.

FATIGUE LIVES

1 For fatigue reasons the major components (e.g. wings and centre-sections) of certain types of aircraft have lives restricted to a specific number of flying hours, flights or landings. These restrictions have, in the main, been confined to large transport type aircraft but more recently it has been found necessary to introduce similar restrictions on certain smaller types of aircraft, some of which are operated in the Private Category.

2 The "lifing" of components is intended to prevent structural failure under the action of repeated air and ground loads experienced in service, the lives being based on the results of tests carried out by the manufacturers of the aircraft. If the specified fatigue life of a critical component is exceeded, the possibility arises of catastrophic structural failure. Where fatigue lives have been imposed, full details have been published by individual manufacturers in their Service Bulletins and compliance with such information is required by the ARB.

3 For the purpose of establishing structural life limitations a landing is defined as an occasion when the main undercarriage wheels make contact with the airfield surface and lift is significantly destroyed. A flight is associated with each landing and therefore the total number of flights pressurised and unpressurised is equal to the total number of landings. A pressurised flight is one in which the aircraft's pressurisation system is operated at a pressure differential of 2lb/in^2 or above.

4 Because of the transfer of components from one aircraft to another, it has in some instances been impossible to establish the remaining safe life of individual components. For this reason it is necessary to ensure that when a component in this category is installed in an aircraft, a record is kept with the aircraft documents showing, as applicable, the hours flown and number of flights or landings already sustained by the component at the time of installation. In the case of pressurised flights the applicable pressure differential may be significant. Certificates of Compliance may not be signed until the signatory is satisfied that the required history of the component has been established.

5 Failure to comply with the above procedure may, due to the absence of evidence showing that the components in question have any remaining safe life, result in owners or operators being required to replace such components prematurely.

NOTE: In addition to recording engine operating hours ARB now require on some turbine engines and APUs that a record be kept of the cycles completed. Engine cycles are defined by engine manufacturers.

6 **Cancellation** This Notice cancels ARB Notice No. 62, Issue 1, dated 1st January, 1967, which should be destroyed.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

AIRWORTHINESS NOTICE

No. 63

Issue 5.

16*th April*, 1974.

CERTIFICATION AND MAINTENANCE OF AIRCRAFT NOT EXCEEDING 2730 kg

1 The Air Navigation Order 1972 stipulates that the Certificates of Airworthiness for aircraft, the maximum authorised weight of which does not exceed 2730 kg, are to be issued only in the General Purpose Category or the Special Category.

NOTES: (1) General Purpose Category aircraft may be used for "any purpose".

(2) Special Category aircraft may be used for "any purpose", other than public transport, specified in the Certificate of Airworthiness but not including the carriage of passengers unless expressly permitted.

(3) Aircraft in any category, the maximum authorised weight of which exceeds 2300 kg and which are flown for the purpose of public transport, are required by the ANO to be operated in accordance with the terms of an Air Operator's Certificate.

2 It is the responsibility of the licensed aircraft maintenance engineer or the approved organisation supervising and/or certifying work, to ensure that it is carried out in suitable accommodation, with the necessary facilities and appropriate technical information available, and in accordance with Maintenance Schedules approved by the CAA.

3 Certificates of Airworthiness for General Purpose Category aircraft, are normally valid for a period of two years, and are endorsed with the approved Maintenance Schedule reference number to which the aircraft is to be maintained. Special Category aircraft may have Certificates of Airworthiness which are valid for one year and in such instances, maintenance work does not have to be carried out in accordance with Maintenance Schedules approved by the CAA. For Special Category aircraft, the Certificates of Airworthiness of which are valid for two years, maintenance work must be carried out in accordance with Maintenance Schedules approved by the CAA.

4 General Purpose Maintenance Schedules approved by the CAA, are available for fixed wing aircraft (reference ARB/GPMS/FW/1971) and helicopters (reference ARB/GPMS/H/1971). Copies of these Maintenance Schedules may be obtained from the Civil Aviation Authority, Printing and Publication Services, Greville House, 37 Gratton Road, Cheltenham, Glos. GL50 2BN, at 75p each. As an alternative, owners may submit their own Maintenance Schedules to the CAA for approval.

5 Amendment No. 1 to schedule reference ARB/GPMS/H/1971 was issued in December 1972, and amendment No. 2 to schedule reference ARB/GPMS/FW/1971, was issued in February 1974. Amendment No. 2 to schedule reference ARB/GPMS/FW/1971 is now available, free of charge, and registered owners, or their agents, should make formal application to the Civil Aviation Authority, Airworthiness Division, Brabazon House, Redhill, Surrey, RH1 1SQ, for the supply of the amendment(s) quoting the registration letters of their aircraft to which the schedule is applicable. Owners, Operators and Engineers are notified that where these schedules are the schedules used for compliance with the ANO, amendments to them are mandatory and must be put into effect as soon as is practicable.

6 Owners of aircraft certified in the General Purpose Category or the Special Category where the Certificate of Airworthiness is valid for 2 years, should advise the CAA Airworthiness Division Area Office when the Check 4 inspection is due, thus providing an opportunity for a Surveyor to inspect the aircraft. This could lead to a reduction in the amount of dismantling required when the C of A is due for renewal. If the C of A renewal and Check 4 inspection can be arranged to take place together this will also facilitate the renewal procedure.

7 To provide an accurate history of the maintenance of the aircraft, a certified record of any work done must be entered in the appropriate log books.

8 All flying times must be recorded and entered into appropriate log books. These log books and associated documents must be preserved for inspection by authorised persons. It is essential that all flying times are accurately recorded; neglect in this respect could lead to the necessity for a more detailed investigation of the aircraft at the time of C of A renewal with possible increased costs to the applicant.

9 **Cancellation** This Notice cancels Airworthiness Notice No. 63, Issue 4, dated 1st December, 1972, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey, RH1 1SQ.

ARB NOTICE

No. 64

Issue 1.

12*th August*, 1971.

DOWTY ROTOL PROPELLERS— No. 20 AND No. 30 SIZE BLADE ROOT BEARINGS

1 It has come to the attention of the ARB that some No. 20 and No. 30 size blade root bearings in Dowty Rotol propellers fitted to Rolls Royce Dart engines have had their tracks reground by organisations other than the bearing manufacturer.

2 These bearings play a critical part in the structure of the propellers and incorrectly ground tracks could lead to a loss of pre-load and to possible fatigue damage to the blades or blade bolts.

3 Evidence available to the ARB regarding the airworthiness of the above mentioned types of propellers is confined to those fitted with bearings the tracks of which have been ground or reground by the bearing manufacturer. Dowty Rotol Service Bulletin No. 61-380 was confirmed by the ARB with mandatory status. This Bulletin prohibits any regrinding of tracks other than by the bearing manufacturer.

4 Evidence available to the ARB about tracks which have been reground by organisations other than the bearing manufacturer is inadequate to judge whether propellers to which these bearings are fitted are or are not of the same airworthiness standard as propellers the bearing tracks of which have been reground by the manufacturer.

5 The ARB therefore requires all operators of UK registered aircraft fitted with Dowty Rotol propellers with No. 20 or No. 30 size blade root bearings fitted to Rolls Royce Dart engines to ascertain whether the blade root bearing tracks have been reground other than by the bearing manufacturer. Any of these propellers with blade root bearing tracks which have been reground other than by the bearing manufacturer must be removed from service as soon as possible and in any case not later than 200 hours of operation from receipt of this Notice.

6 Action to restore such propellers to an acceptable condition is dependent on a number of circumstances, and application for the necessary instructions should be made to Service Manager, Dowty Rotol Limited, Cheltenham Road, Gloucester GL2 9QH, England.

7 As one of the criteria governing the restoration action will be the extent to which pre-load may have deteriorated, operators are advised to seek Dowty Rotol's advice *prior* to stripping the propeller.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

AIRWORTHINESS NOTICE

No. 65*

Issue 1.

25th September, 1972.

DISCONTINUANCE OF ARB CERTIFICATES FOR ENGINE CONSTRUCTION/OVERHAUL

1 It has been the practice to supply British engine constructors and certain organisations approved for the overhaul of engines with books of serial numbered "Certificates of Construction/Overhaul" for inclusion in Engine Log Books.

2 These Certificates have never been a legal requirement, nor do they affect the validity of the Engine Inspection and Test Certificates or of any Certificates of Compliance. It has therefore been decided, after consultation with interested parties, to discontinue their use.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ

*This number was previously used for a Notice concerning manuals for aircraft purchased from overseas operators, which was cancelled in January, 1967.

AIRWORTHINESS NOTICE

No. 66

Issue 2.

18*th October*, 1972.

AIRCRAFT INSURANCE

1 Attention is drawn to the fact that when the CAA Airworthiness Division's Test Pilots fly aircraft for any test purposes neither the CAA nor the Test Pilots accept responsibility for any damage to the aircraft or to third parties or to any person or property whatsoever.

2 All owners are, therefore, required to ensure that insurance policies covering damage to their aircraft and to third parties are suitably endorsed to cover flights by the CAA Airworthiness Division's Test Pilots.

NOTE: It is understood that in general Insurers and Underwriters are willing to extend the cover of their aircraft policies for this purpose on request and without further charge. Existing policies covering ARB activities should be amended to cover CAA Airworthiness Division activities.

3 **Cancellation** This Notice cancels ARB Notice No. 66, Issue 1, dated 1st May, 1966, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ

ARB NOTICE

No. 67

Issue 2.

2nd November, 1970.

RESTRICTIONS ON THE USE OF CERTAIN AIRCRAFT WITH GLUED PLY AND TIMBER TORSION BOX CONSTRUCTION

1 The types of aircraft to which this Notice relates are listed in the Appendix, and are in general those constructed prior to 1950. This Notice does not relate to aircraft having wings and tail surfaces which are fabric covered and which have spars made from solid wood and have no vital glued spliced joints.

2 This distinction is made because the aircraft listed depend for their structural integrity on glued joints to a much greater extent than aircraft having spars made from solid wood and they are more difficult to inspect.

3 In ARB Notice No. 50, concern is expressed as to the possible poor condition of the timber and glued joints in wooden aircraft and warning is given that to ensure that a particular aircraft is in good condition, a good deal of dismantling might be required.

4 ARB Notice No. 50, however, is concerned only with an aircraft condition which might not be noticed because of the difficulty of inspecting ply-covered aircraft but which would be revealed if the aircraft were sufficiently dismantled. The ARB is also concerned about an additional hazard, namely, that of glue deterioration caused by ageing, cycles of humidity, cycles of temperature and the combination of all three effects.

4.1 It has been established that many glues lose strength with age and that cycles of humidity and temperature can result in a further decrease in strength. Most of the glues available before 1950 were affected to a greater extent than those which have become available since that date.

4.2 This type of glue deterioration cannot be detected by any practicable inspection and it is not possible to put a specific life on a glued joint since the rate of deterioration depends on many factors.

5 Whilst it is not possible to state specifically that all or any one of the aircraft in question have so deteriorated in strength that they could be considered unairworthy without this being found by inspection, equally it is becoming increasingly difficult to be sure that all or any one of these aircraft are not in a dangerous condition. In these circumstances it is considered necessary to impose certain restrictions on the use of the types of aircraft listed in the Appendix to this Notice; these restrictions are given in paragraphs 6, 7, 8 and 9 below.

6 No aircraft of the types listed is to be operated in the Transport Categories.

7 No further examples of the types of aircraft listed will be certificated in any Category, and any such aircraft which has been withdrawn from use or sold abroad will not be re-certificated, unless a good case can be made for a particular aircraft.

8 The following limitations are recommended and owners are asked to advise pilots of these aircraft to this effect:—

(a) Manoeuvres should be limited in severity. The normal accelerations in turns and pull-ups should not exceed 2g, i.e. that corresponding approximately to a level co-ordinated turn of 60° bank. In turns in which the angle of bank approaches 60°, particular care should be taken to go into and emerge from the turn smoothly.

(b) Aerobatics should not be performed.

(c) Severe turbulence should be avoided.

9 Prospective purchasers of wooden aircraft of types other than those listed, and not holding current UK Certificates of Airworthiness should consult the ARB as to whether the aircraft would be acceptable for certification. The ARB will require information as to the type of construction, the glue used in the construction, and the previous history of the particular aircraft.

10 Notwithstanding the foregoing the ARB will certificate new light aircraft of glued ply and timber torsion box construction provided they are assembled with a glue considered suitable for the conditions likely to be met in service, and it sees no reason why such aircraft should not have a satisfactory life if they are shielded from the more extreme temperature and humidity effects and are properly housed when not in use.

11 **Cancellation** This Notice cancels ARB Notice No. 67, Issue 1, dated 1st January, 1967, which should be destroyed.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

APPENDIX

The following lists the specific types of affected aircraft.

Avro 652A Anson Series
Avro 19 Series 1

B.A. Swallow

Bellanca 14-13-2

Benes-Mraz Sokol

D.H.80A Pussmoth
D.H.85 Leopard Moth
D.H.94 Moth Minor

Miles M.2 Hawk Major } Series
Miles M.2 Hawk Six }

Miles M.3A Falcon
Miles M.11A Whitney Straight
Miles M.14A Hawk Trainer 3
Miles M.17 Monarch
Miles M.18 Series 2
Miles M.38 Messenger Series
Miles M.65 Gemini Series
Miles M.75 Aries 1

Mooney M20 and M20A

Percival Proctors 1 to 5A
Percival Mew Gull

Reid & Sigrist Desford Trainer

Tipsy Trainer 1
Tipsy B Series 1
Tipsy Junior

NOTE: This list is subject to revision.

A. R. B. NOTICE

No. 68

Issue 1.

1*st January*, 1967.

AIRCRAFT COMPONENTS AND INSTRUMENTS OBTAINED FROM GOVERNMENT SOURCES

1 The attention of all concerned is drawn to the fact that government surplus components and instruments which are offered for sale may have become unserviceable after becoming redundant.

2 Before any such items which have been stored or out of service for a period exceeding twelve months since manufacture or overhaul are fitted to civil aircraft, the Board will require either a certification from the manufacturer that a recent investigation has shown his product to be in a serviceable condition or that the item be dismantled, inspected and, if necessary, overhauled, re-assembled and tested by an appropriately licensed aircraft engineer or an organisation approved for the purpose. This procedure must be followed in respect of items fitted to aircraft obtained from government sources which are qualifying for certificates of airworthiness.

3 **Cancellation** This Notice cancels Notice to Licensed Aircraft Engineers and to Owners of Civil Aircraft No. 68, Issue 1, dated 18th July, 1963, which should be destroyed.

By Order of the Board,

Secretary.

Air Registration Board,
Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 69

Issue 4.

1*st April*, 1971.

ISSUE OF CERTIFICATES OF MAINTENANCE AND CERTIFICATES OF COMPLIANCE OVERSEAS

1 With reference to Articles 9(3) and 10(4) of the Air Navigation Order, 1970, the Department of Trade and Industry have made a Regulation which permits Certificates of Maintenance and Certificates of Compliance in respect of aircraft registered in the United Kingdom to be issued by aircraft maintenance engineers licensed by the duly competent authority in the following countries:—

Antigua
Australia
Bahamas
Barbados
British Honduras
British Virgin Islands
State of Brunei
Burma
Canada
Cayman Islands
Ceylon
Dominica
Ghana
Grenada
Guyana
Hong Kong
India
Jamaica
Kenya
Kuwait
Malawi
Malaysia
Montserrat
New Zealand
Pakistan
Republic of Ireland
Republic of South Africa
St. Christopher, Nevis and Anguilla
St. Lucia
St. Vincent
Singapore
Sudan
Trinidad and Tobago
Turks and Caicos Islands
Uganda
United Republic of Tanzania
Zambia

2 It should be understood that the holders of valid and appropriately rated licences, issued under the law of a country specified in paragraph 1 of this Notice, may only issue Certificates of Maintenance and/or Compliance in respect of United Kingdom registered aircraft when circumstances require that such certificates should be issued while the aircraft is outside the United Kingdom.

3 Operators of public transport aircraft wishing to avail themselves of the advantages of the above are reminded that they must furnish such information as may be necessary to enable the engineers concerned who are to sign the certificates to be satisfied that all the requirements of Chapters A6—4 and A4—3 of British Civil Airworthiness Requirements have been complied with.

4 **Cancellation** This Notice cancels ARB Notice No. 69, Issue 3, dated 5th January, 1970, which should be destroyed.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

AIRWORTHINESS NOTICE

No. 70*

Issue 1.

25th September, 1972.

LEAD FREE AVIATION GASOLINE — TERMINATION OF SUPPLY

1 Introduction

1.1 **Present Position** The grades of aviation gasoline currently available in most countries are as follows :—

Grade	*Maximum Tetraethyl Lead (T.E.L.) Content*	
	(ml/Imp. gal)†	(ml/US. gal)‡
115/145	5.5	4.6
100/130	3.6	3.0
80/87	0.6	0.5
80	0	0
73	0	0

In addition to the above, 108/135 grade is also available in certain Scandinavian countries, but 115/145 grade is being gradually withdrawn throughout the world.

1.2 **Future Position** The CAA has been informed that by early 1973 aviation fuel suppliers intend to :—

(a) Supply a 100/130 grade to specification D.Eng.R.D.2485, except that the TEL content will be limited to a maximum of 2.4 ml/Imp. gal (2.0 ml/US. gal). This new grade will be known commercially as Avgas 100L (except in the USA where it may be alternatively known as "The Avgas").

(b) Terminate the supply of the 80/87, 80 and 73 grades.

1.3 **Implementation of the above changes**

1.3.1 **United Kingdom and European Continent** Avgas 100L grade, is already being distributed, and when all existing stocks of the 100/130 grade with the higher lead content have been replaced by Avgas 100L, all grades lower than 100/130 will not be replenished. This situation will probably be reached by early 1973.

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*This number was previously used for a Notice concerning L.A.E. Notices, which was cancelled in December, 1966.
†millilitres per Imperial gallon
‡millilitres per US gallon

1.3.2 **Other than United Kingdom and European Continent**
In due course the existing 100/130, 80/87, 80 and 73 grades will be withdrawn, and only Avgas 100L grade will be available. The timing of this change is not known with certainty, but probably it will occur during 1973.

1.4 **Implications**

1.4.1 The use of aviation gasoline of a higher grade (i.e. knock rating — octane number or performance number) than the minimum approved for the engine does not create a problem, unless it contains more TEL than the maximum approved for the engine in which case it can have deleterious effects. These effects can include inlet valve head burning, exhaust valve erosion, valve sticking, spark plug erosion and fouling by lead deposits, piston ring sticking and lead deposits in the oil.

1.4.2 This Notice is, therefore, issued to state the action to be taken with respect to piston engines which :—

(a) Are approved to use only aviation gasoline the TEL content of which is less than 2.4 ml/Imp. gal.

(b) Are approved for use with both leaded and unleaded gasoline.

(c) Are approved for use with current standard 100/130 grade.

(d) Are at present required to be run on lead-free aviation gasoline at the conclusion of series and overhauled engine acceptance tests, or prior to long term storage, in order to minimise corrosion.

2 Recommended Procedures

2.1 **For engines in 1.4.2(a)**

(a) The following engine manufacturers have already considered the effect of using fuels with a higher lead content than that originally approved for their engines, and have amended their manuals to deal with the new circumstances. These amended procedures should be followed :

(i) Rolls-Royce Motors Limited (see Rolls-Royce Light Aircraft Engine Service Bulletin No. T-183 which incorporates Teledyne Continental Motors Service Bulletin No. M71-9).

(ii) Avco Lycoming Division (see Avco Lycoming Service Instruction No. 1070).

(b) Where manufacturers' recommendations in respect of the effect of using Avgas 100L are not available, e.g. in respect of old engines which are no longer supported by the constructors' design organisation, the following action should be taken :

(i) When aviation gasoline with TEL content less than 2.4 ml/Imp. gal is no longer available Avgas 100L grade gasoline may be used subject to a monitoring programme, such as will reveal any adverse effects, being followed. Such a programme should be submitted to the CAA Area Office for agreement and it should include, at least, checks of power, cylinder compression, sparking plug condition, and oil and oil filters for evidence of sludging.

(ii) Depending on the results of the monitoring programme, the frequency of sparking plug changes, oil changes and top overhauls may need to be increased. In particular, those Gipsy Major 1 and Gipsy Six 1 engines, with aluminium-bronze cylinder heads will be particularly susceptible to corrosion, and frequent top overhauls will be necessary unless they are converted to a variant of engine which can be operated on leaded gasoline.

2.2 **For engines in 1.4.2(b)** Certain engines approved for use with leaded and unleaded gasoline may have qualified for particular maintenance periods based on the use only of unleaded gasoline. When a change is made from the use of unleaded gasoline to a grade with a significant lead content, these previously acceptable periods will need to be reviewed. In such circumstances, operators must consult the CAA Area Office concerned prior to the use of leaded gasoline and obtain the revised periods to be initially adopted.

2.3 **For engines in 1.4.2(c)** Where the lead content of a grade of fuel approved for an engine is reduced it would be expected to have beneficial effect. All engines approved for use with 100/130 grade gasoline may therefore use Avgas 100L without restriction.

2.4 **For engines in 1.4.2(d)** The practice of running engines on lead-free gasoline at the conclusion of acceptance tests may now be waived provided all other preparations for storage, as given in the relevant manuals, are observed, e.g. running with corrosion preventive oil, spraying cylinder interiors, using dessicants in cylinders and in engine openings. Where long term storage is involved particular attention should, however,

be given to the frequency of check inspections for cylinder and valve corrosion. (Experience in the US and France has indicated that the foregoing should prove to be adequate).

3 Dangers Of Using Motor Gasoline Engine certification depends on the use of approved fuels, and it is mandatory that only such approved fuels, and not motor gasoline, are used. There are differences between the properties and composition of motor and aviation gasoline which make the former unsuitable for use in aircraft engines. Motor gasoline is deficient in the following main respects :—

(a) It has a wider distillation range than aviation gasoline, and this can promote uneven distribution of the anti-knock components of the fuel in the induction manifold.

(b) The knock rating of motor and aviation fuels are not directly comparable because of the different methods used to determine the knock ratings of the two types of fuel. This results in an appreciable difference in actual detonation characteristics of two fuels which are ostensibly of the same knock rating. This difference could lead to destructive pre-ignition or detonation.

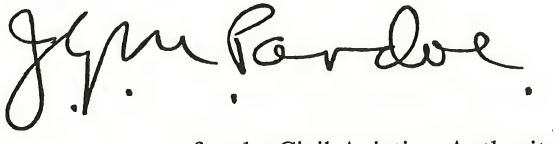
(c) It is more volatile and has a higher vapour pressure which can lead to "vapour lock" occurring, particularly at altitude.

(d) Compared with aviation gasoline, which contains only the chemically correct amount of bromine, the tetraethyl lead additive in motor gasoline contains an excess of chlorine and bromine. The chlorine is very corrosive and under severe conditions can lead to exhaust valve failures.

(e) It is less stable than aviation gasoline and can form gum deposits which can result in valve sticking.

(f) It has solvent characteristics which may not be suitable for aircraft engines. Seals, gaskets and flexible fuel lines are susceptible to attack.

(g) It is not handled or controlled in accordance with the same rigid procedures as is the case with aviation gasoline.



for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

AIRWORTHINESS NOTICE

No. 71*

Issue 2.

21*st December*, 1973.

FILAMENT WOUND, FIBRE-GLASS, HIGH PRESSURE VESSELS

1 Introduction

1.1 Filament wound, fibre-glass, high pressure spherical vessels, produced in the United States of America by Apex Fibre-glass Products, Cleveland, Ohio, are used in a number of light aircraft, mainly of USA origin, usually as reservoirs of high pressure air in pneumatic de-icing systems. Such systems are, of course, supplied to aircraft manufacturers and owners by various equipment companies.

1.2 The manufacturer's recommended scrap life of the vessels is three years from the date of manufacture. The main reason for this limitation is a loss of physical strength caused by deterioration of the laminate as the result of the absorption of moisture. It is understood that manufacture of the pressure vessels ceased in 1964: therefore all vessels which are either installed in aircraft, or are in storage, have now exceeded the calendar life limitation.

2 Requirement

2.1 Apex pressure vessels installed in Beagle 206 Aircraft are already subject to mandatory action, as detailed in Scottish Aviation Ltd., Service Bulletin No. B206/48.

2.2 The CAA, acting on the advice of the manufacturer, and in the absence of any information which would enable assessment of the residual strength of the vessels to be made, requires that such vessels which are installed in United Kingdom registered aircraft shall, as soon as they are no longer needed, but in any event by 1st May 1974, be de-pressurised and the associated aircraft system be suitably placarded as inoperative until an alternative vessel is incorporated.

2.3 In the meantime until compliance is shown with 2.2, the following shall apply :—

(a) The vessel should not be pressurised beyond 1,000 lb/in²†.

* This number was previously used for a Notice concerning L.A.E. Notices, which was cancelled in December, 1966.

† Consideration will be given to pressure in excess of 1,000 lb/in², but not in excess of 1,500 lb/in², where an x-ray examination, acceptable to the CAA, has shown that there has been no adverse deterioration in strength of the pressure vessel.

(b) A placard shall be displayed at the charging point, stating the maximum charging pressure of the vessel.

(c) For aircraft cleared for flight in icing conditions, a placard shall be displayed, visible to the pilot, stating that the system is intended to provide protection only in the event of an inadvertent icing encounter.

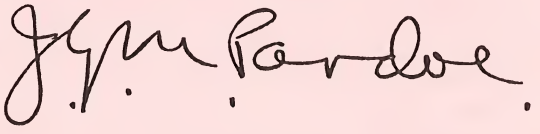
2.4 The CAA has been advised by the manufacturer that, in some cases, neither the name of the manufacturer, nor the part number, has been marked on the vessel (see 3.2), but generally the vessel can be identified by the name Apex, or by a part number which would fall into one of the following classifications :

'8H' 19000 Series (e.g. 8H-19374)
'8H' 19000 Series followed by a hyphen and a two-digit number (e.g. 8H-19319-14)
65000 Series (e.g. 65007)

3 Recommendations

3.1 It is recommended that proof pressure testing of this type of vessel should not be attempted for any purpose, and all such vessels should be removed from aircraft, and together with those in storage, should be rendered unusable and scrapped, when replacements are available.

3.2 Where a vessel of similar construction to those covered by this Notice is not positively identifiable, enquiries should be made of the aircraft constructor in order to determine the vessel's identity and recommended scrap life.



for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

AIRWORTHINESS NOTICE

No. 72*

Issue 1.

16*th April*, 1974.

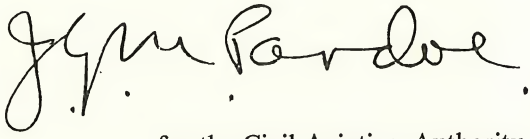
THE REGISTRATION OF AIRCRAFT AND CONTINUING AIRWORTHINESS

1 The Airworthiness Division of the CAA finds it necessary from time to time (often at short notice) to convey to owners and those in charge of aircraft information essential to ensure the continuing airworthiness and safety of particular types of aircraft, engines and equipment.

2 The most direct means available to the CAA for tracing owners and those in charge of particular aircraft is through the name and address of the person in whose name the aircraft is registered. In view of the possible serious consequences of information not reaching the current owner of a particular aircraft, it is important that notifications of changes, required to be made "forthwith" in accordance with Article 4(11) of the Air Navigation Order 1972, are indeed made promptly.

3 There are many cases in which the registered owner leases, or loans, aircraft registered in his name to a third party, who would, of course, be unknown to the Authority. In this event, the co-operation of the registered owner is necessary, in passing on promptly to the third party, information received from the CAA.

4 Article 8(7) of the Air Navigation Order 1972 states those conditions under which a Certificate of Airworthiness or Validation ceases to be in force. Paragraph 1 of this Notice is relevant to Article 8.



for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey, RH1 1SQ.

*This number was previously used for a Notice concerning Heron aircraft which was cancelled on 1st January, 1967.

A. R. B. NOTICE

No. 73

Issue 1.

1*st May*, 1966.

CORROSION OF AIRCRAFT STRUCTURES

1 Recent airframe surveys carried out on metal aircraft have revealed potentially serious conditions of corrosion on a variety of pressurised types. While most of the aircraft concerned have been in service for more than seven years, in some cases these conditions have developed after three years of service.

2 Deterioration in skin thickness of more than fifty per cent and cracks in fuselage skins have been found shortly after aircraft have been declared airworthy following a major check in accordance with the maintenance schedule.

3 Normal methods of inspection supplemented by non-destructive testing procedures have often proved inadequate because of the problem of obtaining access to enclosed areas and the difficulty of interpreting the results obtained when using radiology and ultrasonic methods. However, improvements in radiological techniques have recently been made and the advice of the aircraft constructor should be sought for information on these new techniques.

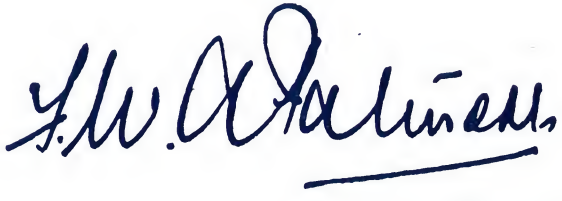
4 Since corrosion can be intergranular, removal of the superficial products of corrosion, followed by reprotection, is not necessarily effective and often skin replacement will be required. All repairs necessitated by corrosion attack must be made to an approved repair scheme in accordance with the manufacturer's recommendations. Further information on corrosion and remedial techniques is contained in Civil Aircraft Inspection Procedures, Leaflets BL/4—1, BL/4—2, BL/4—3 and AL/7—13. (See A.R.B. Notice No. 6 for details of the method of obtaining these leaflets.)

5 Although manufacturers' manuals and service bulletins give useful guidance as to inspections and areas most likely to be attacked, special attention should be given to skin panels in poorly drained areas and in particular the faying surfaces of

stringer to skin panels. Fuselage keels, and structures concealed by sound proofing and hidden below the double skins of freight bay floors, are typical of the areas liable to attack.

6 Operators and engineers are reminded of the constant need for vigilance, particularly where pressurised aircraft are concerned. Confirmed evidence of significant corrosion should be reported at once to the constructors and to the Board.

By Order of the Board,



Secretary.

Air Registration Board,
Brabazon House,
Redhill,
Surrey.

AIRWORTHINESS NOTICE

No. 74

Issue 2.

7th June, 1973.

CERTIFICATION AND MAINTENANCE OF UNITED KINGDOM CIVIL HOVERCRAFT

1 Introduction

1.1 ARB Notice 74, Issue 1, issued in 1966, covered the arrangements made when the intrinsic safety of hovercraft was administered, under the Air Navigation Order, by the Air Registration Board from the time of its being requested to do so in June 1961, until the creation of the CAA in April 1972, and was also valid until the Hovercraft (General) Order 1972 came into full operation on 26th June 1972.

1.2 Since hovercraft matters are now dealt with by hovercraft documents, and since aircraft documents do **not** apply also to hovercraft, unless specifically so stated, it is intended that this notice should serve as an introductory notice only. Further hovercraft information will be promulgated through appropriate hovercraft media such as those referred to in para. 2 and 5.

NOTE: Hovercraft documents issued by the CAA, or used under CAA hovercraft approval, will be identifiable by the use of the word "hovercraft" or of a hovercraft approval reference.

2 U.K. Legislation Since the passing of the Hovercraft Act 1968, which provided, in effect, for hovercraft to be treated as vehicles in their own right, and not automatically subject to laws made specifically for other types of vehicle, a number of Statutory Instruments (SI) have been promulgated. A list of these, which constitutes the current UK hovercraft legislation, is given in this para. 2.*

The Hovercraft Act 1968

The Hovercraft (General) Order 1972 (SI. 1972/674)

NOTE: This order deals with Registration and Safety.

The Hovercraft (Application of Enactments) Order 1972 (SI. 1972/971)

NOTE: This order makes applicable to hovercraft certain legislation, in a modified form, which is already applicable to other forms of transport. Matters covered include collision avoidance, distress, salvage, casualty investigation, and the functions of the Airworthiness Requirements Board in relation to hovercraft in such a way as to parallel those it has for aircraft.

*Obtainable from H.M. Stationery Office, 49 High Holborn, London WC1V 6HB

The Hovercraft (Civil Liability) Order 1971 (SI. 1971/720)

The Hovercraft Act 1968 (Commencement) Order 1972 (SI. 1972/979)

The Hovercraft (Fees) Regulations 1972 (SI. 1972/852)

The Hovercraft (Fees) (Amendment) Regulations 1972 (SI. 1972/1741)

The Civil Aviation Authority (Hovercraft) Regulations 1972 (SI. 1972/862)

3 Working Arrangements

3.1 The Department of Trade and Industry (DTI) Marine Division, is responsible for operational safety matters, including the prescription of requirements for facilities or equipment needed for compatibility with a specific operational environment.

3.2 Under the Hovercraft (General) Order the only area of interest of the CAA in hovercraft and their equipment corresponds substantially to the aeronautical interest of CAA Airworthiness Division. The Division has established a Hovercraft Department within which its hovercraft work and liaison with marine authorities is concentrated; when necessary, this Department enlists the advice or assistance of other staff.

3.3 The Hovercraft Requirements Committee (comprised of technical representatives from manufacturers, operators, Lloyd's Register of Shipping and Government bodies), created to advise the staff of the Air Registration Board, now advises the hovercraft staff of the CAA on requirement matters.

3.4 In order to ensure that hovercraft are treated on their own merits, but without losing the experience of other fields, the Airworthiness Requirements Board has created a Hovercraft Committee to advise it on hovercraft matters. This Committee has a balanced composition as between hovercraft and independent interests, and as between manufacturers and operators. The independent membership includes persons with experience of safety matters in marine and aviation fields.

4 Approval of organisations

4.1 Hovercraft approval of organisations is based on a similar philosophy to CAA aircraft approval of organisations, but differs in important details, which are related to the specific needs of the hovercraft industry. Hovercraft approval is, generally, simpler to negotiate, and permits greater freedom of operation. Aircraft approval of an organisation does not

connote hovercraft approval of an organisation (which is handled by the Hovercraft Department) or vice-versa, but organisations needing hovercraft approval, which are already the holders of, for instance, a CAA aircraft approval, may find that much of the work needed to obtain approval has already been done. In some cases it is convenient for a local, or specialist, CAA Airworthiness Surveyor to be the normal channel of communication between such an organisation and the CAA Hovercraft Department.

4.2 A modified form of CAA hovercraft approval is applied to organisations designing or constructing "Hoverplatforms", and this together with appropriate exemptions from DTI on operational safety matters, provides for simpler safety arrangements to be acceptable for certain heavy, non-self-propelled industrial vehicles using the air cushion principle.

4.3 The CAA will make available a current list of hovercraft-approved organisations to those organisations in the industry which request it.

5 Publications and Information

5.1 **Requirements.** Since 1962, the design and construction requirements for hovercraft have been contained in the provisional British Civil Air Cushion Vehicle Safety Requirements; these have now been replaced as a basis for certification by British Hovercraft Safety Requirements (BHSR). The price of BHSR is £2 per set including binder, which includes entitlement to issue of all amendments made up to 31st December 1973, without further charge. After this date an amendment service will be operated at a price to be announced.

5.2 **Notices.** So far a few hovercraft matters have arisen which would normally have been dealt with by the issue of a "Notice", but these have been dealt with by other means. However, the creation of a separate "CAA Hovercraft Notice" series is envisaged so as to avoid confusion regarding applicability. CAA Hovercraft Notices will form a complete series in themselves, and when this series is initiated no Airworthiness Notice, other than this Notice No. 74, will refer to hovercraft. This Airworthiness Notice No. 74 contains hovercraft information for those who are not involved in the hovercraft field, but may so become in the future.

5.3 **Publications.** Requests for publications, including British Hovercraft Safety Requirements (BHSR) and Hovercraft Notices, should be made to Civil Aviation Authority, Printing and Publication Services, Greville House, 37 Gratton Road, Cheltenham, Glos., GL50 2BN, England, quoting 'Hovercraft'.

5.4 **General and Technical Enquiries.** These should be addressed to the Civil Aviation Authority, Airworthiness Division, Hovercraft Department, Brabazon House, Redhill, Surrey, RH1 1SQ, England. Telephone: Redhill 65966, Telex: 27100 quoting 'Hovercraft'.

6 Cancellation This Notice cancels ARB Notice No. 74, Issue 1, dated 12th May, 1966, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

AIRWORTHINESS NOTICE

No. 75

Issue 5.

7th June, 1973.

OVERHAUL PERIODS FOR VARIABLE PITCH PROPELLERS FITTED TO AIRCRAFT NOT EXCEEDING 2730 kg MAXIMUM AUTHORISED WEIGHT

1 **Introduction** Recent investigations indicate the desirability of ceasing to associate with calendar time the period between overhaul for variable pitch propellers fitted to aircraft not exceeding 2730 kg maximum authorised weight.

2 **Overhaul Periods**

2.1 As from the date of this Notice, provided the requirements detailed in paragraph 3 are complied with, the manufacturers' recommendations for periods between overhaul based on operating hours only need be applied.

2.2 The inspection detailed in paragraph 3.1 shall be completed at three-yearly intervals after the propeller is installed on an aircraft, and may be performed by an organisation approved by the CAA for the purpose or, with the agreement of the local CAA Area Office, by an aircraft maintenance engineer licensed in Category C for the type of engine to which the propeller is fitted, provided that the necessary tools, equipment and data are available, and the recommendations of the manufacturer are observed.

3 **Inspection Requirements**

3.1 The following requirements shall be complied with at three yearly intervals:—

(a) The propeller must be dismantled sufficiently to gain access to the blade root bearing assemblies.

(b) The complete root assembly must be thoroughly cleaned using methods recommended by the manufacturer.

(c) An examination for pitting, fretting corrosion and other damage must be made of the hub, bearings, blade roots and housing, using an acceptable non-destructive technique. All of the blade surfaces must be examined for the presence of corrosion, removing the paint finish as necessary. Any corrosion must be removed, and the blade must be reprotected in accordance with the manufacturer's recommendations.

NOTE: The appropriate Manufacturer's Overhaul Manual or Bulletin must be used as a basis for this work.

(d) Provided that the condition of the blades and the blade root assembly is found to be satisfactory, the propeller may be re-assembled and checked in accordance with the manufacturer's recommended procedure.

(e) After re-assembly and refitting, the propeller must be 'check' tracked, the engine ground run, and the propeller exercised, to ensure that there is no sluggishness in operation or undue vibration.

3.2 A record of inspection and work done must be entered in the appropriate log book, making reference to this Notice.

4 **Cancellation** This Notice cancels ARB Notice No. 75, Issue 4, dated 1st April 1971, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

AIRWORTHINESS NOTICE

No. 76

Issue 2.

1*st December*, 1972.

POWER SUPPLY SYSTEMS FOR AIRCRAFT RADIO INSTALLATIONS

1 Introduction

1.1 Introduction of the General Purpose Category Certificate of Airworthiness on 31st March 1972 necessitates the revision of this Notice.

1.2 Issue 1 of the Notice drew attention to the dangers of operation of aircraft in which the entire radio installation was supplied via a single electrical feeder circuit, and prescribed that Certificates of Airworthiness would no longer be issued or renewed in respect of aircraft certificated in the Transport Category with such systems.

1.3 Experience has shown that the requirements of Issue 1 need to be re-expressed in terms which will cater for both the Transport Category and the General Purpose Category, where the latter are required to carry radio when operated for the purpose of Public Transport.

1.4 The requirements to be met for electrical feeder arrangements for these categories are detailed in 2.

2 Requirement

2.1 The electrical feeder arrangements shall be such that it can be shown that :—

(a) Where more than one item of radio apparatus is installed, no likely single failure (e.g. a fuse or relay) will result in the loss of all items of apparatus.

NOTE: It is strongly recommended that such a failure should only result in the loss of one item of apparatus.

(b) Where duplicate apparatus, or apparatus which can duplicate a function, is installed, no likely single failure (e.g. a fuse or relay) will result in the loss of both items of apparatus.

3 Implementation

3.1 **Aircraft in Transport Category.** Certificates of Airworthiness will not be issued or renewed, unless the requirements of paragraph 2 have been complied with.

3.2 **Aircraft in General Purpose Category.** After 31st March 1973 aircraft certificated in the General Purpose Category which are required to carry radio, when operated for the purpose of public transport, must comply with paragraph 2. Where compliance is not shown a placard in the following form must be installed in a prominent position in the crew compartment :—

> **RADIO INSTALLATION**
> **ELECTRICAL POWER SUPPLIES**
> Airworthiness Notice No. 76 has not been complied with. Public Transport Operations where radio facilities are a mandatory requirement, are prohibited.

4 **Cancellation** This Notice cancels ARB Notice No. 76, Issue 1, dated 24th August, 1966, which should be destroyed.

for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

ARB NOTICE

No. 77

Issue 1.

5th October, 1967.

COUNTER/POINTER ALTIMETERS

1 The United Kingdom Altimeter Committee in 1965 concluded the best altitude presentation was provided by the counter/pointer type instrument. The ARB is satisfied that subsequent experience has supported this conclusion.

2 In the case of turbo-jet-engined aircraft, in which hazardous misreading of altimeters is more likely to occur, it is desirable to eliminate reliance on the less satisfactory types of presentation. Therefore, subject to the provisos of paragraph 3, all turbo-jet-engined aircraft of over 12,500 lb all up weight must, not later than 1st June, 1968, have as a minimum one of the following :—

(i) One approved counter/pointer type instrument visible to both crew members, in addition to their normally positioned altimeters, or

(ii) One approved counter/pointer type instrument in the Captain's normal altimeter position, in addition to the existing altimeters at other crew stations.

3 The following exceptions to paragraph 2 are permissible :—

(i) The ARB, whilst preferring the arrangement described in paragraph 2, will continue to accept drum/pointer altimeters where these are standard equipment on existing aircraft and aircraft under construction. (For newly designed aircraft drum/pointer altimeters will not be accepted.)

(ii) Recognising differences of policy and practice internationally and having regard to possible hardship, the ARB will consider on an individual basis, the acceptance of the

existing installation on aircraft which will be removed from the U.K. Register before 31st December, 1968.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 78

Issue 1.

1*st July*, 1968.

INADVERTENT FUEL TRANSFER IN FLIGHT (all types of aircraft need to be considered)

1 **Introduction** Problems of inadvertent fuel transfer in flight have been reported on the particular aircraft types listed in paragraphs 2 and 3 below. However, operators of *all types of aircraft* are asked to consider their own aircraft fuel systems to determine whether similar problems could occur and if so to guard against them by suitable training and practices in regard to both maintenance and flight operations.

2 **Canadair C4 (Argonaut), Douglas DC4/C54 and Carvair Aircraft**

2.1 A fatal accident to a Canadair C4 is attributed to a loss of power in both engines on the starboard side. The loss of power is attributed to inadvertent fuel transfer leading to fuel starvation of one or both engines. Other cases of significant inadvertent fuel transfer have since come to light.

2.2 Some of the types listed, and also other aircraft, use main/auxiliary tank selector fuel cocks and inter engine/cross ship crossfeed cocks made by the Parker Appliance Co. It is a feature of these cocks that when correctly positioned the ports not required are closed by carbon pads. However, at intermediate positions (about 10° or more from the correct selection) the carbon pads do not completely cover any of the ports and the cocks are then partially open; in these positions not only is the next selection partially made but also all ports are connected together through the clearances in the cock.

2.3 This feature has led, through slight misrigging of the cock controls or slight mis-selection of the cockpit lever, to inadvertent transfer of large quantities of fuel in flight. This transfer should be shown by the fuel gauges and confirmed by the amount of fuel uplifted into each tank at the next refuelling. However, if the problem is not appreciated the transfer can pass unnoticed and the gauge readings can be attributed to gauge inaccuracy which then builds a climate in

which fuel transfer is likely to be masked by a reputation for gauge inaccuracy. This is a situation which may have led to the Canadair C4 accident.

2.4 Operators must ensure precise rigging of fuel cock control systems and maintenance of the correct feel of detent positions and ensure that their pilots are aware of the need and reasons for correct positioning of the cock lever and prudent use of the fuel gauges.

2.5 Operators should further assess the ease of correctly positioning the cock levers when seated in the flight position and wearing safety harness. If any difficulty can exist (as is the case with the Canadair C4) in ensuring that the levers are in the extreme or detent positions, crews should be warned of the fact and suitable practices developed to ensure correct selection of cock lever positions.

3 Boeing 707 Aircraft

3.1 Several cases of unintended transfer of very considerable quantities of fuel have been reported. These have occurred during flight with the manifold valves open when fuel use was intended to have been determined by booster pump selection.

3.2 Correct fuel use in these circumstances depends on correct non-return valve operation. In the event of a non-return valve malfunction causing it to remain open fuel can flow at a very high rate into the affected tank. In the cases reported no mechanical faults to which the malfunction could be attributed were found and non-return valve malfunction has been attributed to ice. The incidents were safely contained by the transfer being recognised from the fuel gauges and by the appropriate use of booster pumps and manifold valves.

3.3 Operators must ensure that their crews are aware of the possibility of such fuel transfer and that, in the event of it occurring, their practices would detect it before a dangerous situation could arise.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 79

Issue 1.

20*th March*, 1972.

CIVIL AVIATION AUTHORITY

1 **Introduction** The Civil Aviation Act 1971 established a public authority concerned with civil aviation. It will be known as the Civil Aviation Authority (CAA).

NOTE: Copies of the Civil Aviation Act 1971, Chapter 75, may be obtained from Her Majesty's Stationery Office, price 65p net.

2 **The Airworthiness Division** As from 1st April 1972 the staff of the Air Registration Board and its functions will be transferred to the Airworthiness Division of the Civil Aviation Authority and all applications and enquiries hitherto addressed to ARB Head Office should be addressed to the Civil Aviation Authority, Airworthiness Division, Brabazon House, Redhill, Surrey RH1 1SQ. ARB Notice No. 2 will be reissued on 1st April 1972 and will give details of all CAA Airworthiness Division Offices as they will be on 1st April 1972. All certificates, approvals and licences previously issued by, or on the recommendation of the ARB, will be issued by the CAA. Thus approvals will be known as CAA approvals, certificates as CAA certificates and licences as CAA licences.

3 **Continued Validity** Any certificate, licence or approval issued by the ARB or by the DTI on the recommendation of the ARB and any rulings either general or particular given by the ARB will remain in force until revoked or changed by the CAA. In the case of Aircraft Maintenance Engineers' Licences, a new licence bearing the correct reference will be issued when the licence is renewed.

4 **Publications**

4.1 A large scale printing programme has started so that relevant procedural and administrative parts of British Civil Airworthiness Requirements (BCAR) will be reissued on

1st April 1972 bearing references to the CAA and to the new legislation. There will also be issues of another Section of BCAR — Section K, Light Aeroplanes, and of Civil Aircraft Inspection Procedures (CAIP) on 1st April. Although these are issued for routine amendment purposes, there will be advice as to how references should be interpreted in those parts of the publications which have not been amended by 1st April.

4.2 The position in relation to the main publications hitherto prepared and published by the ARB is that they will become CAA publications and the following points should be noted:—

British Civil Airworthiness Requirements Any reference to the issue of certificates, approvals and licences should be read as referring to the issue of such documents by the CAA. References to the 'ARB' or 'the Board' (e.g. 'the Board shall be consulted', 'by agreement with the Board') shall be read as references to the CAA. Several chapters of Section A, together with a substantial part of Section K, Light Aeroplanes, will be issued on 1st April, and the amended chapters will reflect the new position of BCAR under the CAA. The effect of these changes can then be translated into other chapters of the same Sections and other Sections of BCAR. These will be amended to reflect the new position under CAA as the occasion arises.

NOTE: One of the effects of the amendments to Section A will be to require a single application for a Certificate of Airworthiness to be made direct to the CAA Airworthiness Division, Brabazon House, Redhill, Surrey. Under this arrangement all issues and renewals of Certificates of Airworthiness will be made from Brabazon House after 1st April 1972.

Civil Aircraft Inspection Procedures An issue of leaflets is to be made on 1st April 1972 and here, again, they will reflect the position under the CAA and the same general principles followed as in the case of BCAR.

ARB Notices After 1st April these will be known as 'Airworthiness Notices' printed in black on grey paper. Existing Notices will be brought into line as the occasion demands.

Mandatory Aircraft Modifications and Inspections Summary All references to ARB will be deleted as individual sections of this publication come up for reissue. They will reflect the position of the CAA being the Authority responsible for classifying modifications as mandatory.

ARB Approved Organisations The title of this document will be changed to 'CAA Approved Organisations' and all references will be changed as relevant parts of the publication become due for reissue.

ARB Approvals Compendium The title of this document will be changed to 'Airworthiness Approvals Compendium' and all references will be changed as relevant parts of the publication become due for reissue.

General In all other publications amendments will be made as the opportunity occurs. The Publications Order Form hitherto known as ARB Publications Order Form will for the time being be known as 'Airworthiness Publications Order Form' and it will be issued by the CAA. Copies of the Form may be obtained from Civil Aviation Authority, Technical Publications Department, Greville House, 37 Gratton Road, Cheltenham, Glos. GL50 2BN.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

ARB NOTICE

No. 80

Issue 1.

20*th March*, 1972.

CERTIFICATES OF RELEASE

1 Article 10 of the Air Navigation Order 1972, which comes into force on 1st April 1972, introduces a Certificate of Release for aircraft certificated in the General Purpose Category when flying for the purpose of the public transport of passengers. The form of the Certificate of Release is identical to the Maintenance Release which is reproduced in the General Purpose Maintenance Schedules reference ARB/GPMS/FW/1971 and ARB/GPMS/H/1971.

NOTE: Copies of the Air Navigation Order 1972 (SI 1972 No. 129) may be obtained from Her Majesty's Stationery Office, price 68p net.

2 Article 12(2) of the Air Navigation Order 1972 entitles the holder of an Aircraft Maintenance Engineer's Licence to issue Certificates of Release subject to the licence containing the appropriate rating(s). All appropriately licensed engineers may therefore exercise this privilege with effect from 1st April 1972 and all licences will be re-issued at the first renewal after 1st April 1972 to reflect this position.

By Order of the Air Registration Board,

Secretary.

Brabazon House,
Redhill,
Surrey.

AIRWORTHINESS NOTICE

No. 81

Issue 1.

20th July, 1972.

EMERGENCY POWER SUPPLY FOR ELECTRICALLY OPERATED GYROSCOPIC BANK AND PITCH INDICATORS (ARTIFICIAL HORIZONS)

1 Introduction

1.1 Studies of those aircraft accidents and incidents in recent years which have involved total loss, or interruption, of generated electrical supplies on public transport aircraft, indicate that a major factor in the ability of the crew to maintain safe flight is the continuation of presentation to the pilot of reliable aircraft attitude information. Two fatal accidents since 1968 have been attributed to failure of power supplies resulting in the loss of horizon information for flight in 'blind' conditions. Incidents have also occurred which could have been catastrophic if the crew had been totally dependent on horizon instrument, rather than visual, information.

1.2 All public transport aircraft operated on the United Kingdom Register the safety of which depends on electrical services, are equipped with some form of standby or emergency electrical power supply. On many aircraft these emergency supplies are provided by batteries of sufficient capacity to maintain essential services for a flight time sufficient to reach an airfield and make a landing. However, on a number of aircraft types the adequacy and duration of these supplies is critically dependent on crew response time in recognising the emergency, and in completing particular drills to isolate the battery supply to prevent it being discharged into loads on the main electrical system. It is considered that the ability of the crew to cope with a major interruption of electrical supplies would be improved if they had knowledge that continuity of horizon information was not totally dependent on their prompt and correct execution of emergency drills.

1.3 The purpose of this Notice is to publish a requirement for the retrospective modification of certain classes of aircraft to ensure that continuity of horizon information is maintained.

1.4 Aircraft types fitted with air driven gyroscopic bank and pitch indicators are exempt from the requirements of this Notice.

2 Requirement

2.1 Compliance with paragraphs 2.2 and 2.3 of this Notice, or with a CAA approved alternative providing an equivalent level of safety, is required as soon as practical but not later than 1st January 1974, for,

(a) aircraft certificated in the Transport Category for the carriage of more than 19 persons over the age of three years, and

(b) aircraft the maximum authorised weight of which exceeds 15900 kg.

2.1.1 Where it can be shown that an aircraft detailed in 2.1 (a) or (b) will be permanently removed from service prior to the 1st January 1975, the Authority may, on application, waive the requirements of this Notice where it is satisfied that compliance would not be justified in the circumstances of the particular case.

2.1.2 Compliance will also be required for newly constructed aircraft the maximum authorised weight of which exceeds 5700 kg, for which a U.K. Certificate of Airworthiness in the Transport Category is first issued on or after 1st January 1974.

2.2 Where it cannot be shown that in the event of a total failure of the main electrical generating system, an adequate supply will be available automatically to a suitable bank and pitch indicator for a minimum period of 30 minutes, assuming that no special crew action is taken for 10 minutes, then a separate emergency supply, independent of the aircraft electrical generating system, which will automatically supply such an instrument, and its associated lighting, for a minimum period of 30 minutes, shall be provided.

2.2.1 Where the emergency supply is provided by a separate battery it is permissible for this battery to be (trickle) charged from the main electrical generating system, provided that the installation is such that the battery cannot discharge back into the main system.

2.3 The instrument supplied in accordance with 2.2 shall be—

(a) the third instrument (standby horizon) where this is provided, or failing such provision,

(b) the bank and pitch indicator fitted to the Captain's flight instrument panel.

2.3.1 Where the third instrument is fitted it shall :—

(a) Operate independently of any other attitude indicating system.

(b) Be so located on the instrument panel that it will be visible to, and usable by, both pilots from their normal positions.

(c) Be compatible in presentation with the main attitude indicating system.

(d) Be fitted with a failure warning device. Alternatively a means of indicating that the power supply to the instrument is operating correctly shall be provided.

2.3.2 Where the instrument on the Captain's flight instrument panel is utilized :—

(a) The circuitry to the instrument shall be modified, as necessary, so that transfer to the emergency source of supply is automatically effected in the event of failure of the main supply.

(b) The requirements of paragraph 2.3.1(d) shall be met.

3 Additional Information

3.1 Representations have been made to CAA that under conditions of widespread adverse weather, or heavy traffic density at airports, a period of 30 minutes may be a less than desirable time for flight to a suitable airfield and landing, and clearly this period by itself is inadequate for long range aircraft.

3.1.1 The basis of U.K. certification of all long range, and of certain short/medium range, aircraft types is that after a period of interruption of electrical supplies it will be possible for the crew to re-establish sufficient normal, or emergency, generated power to support all necessary essential services, including the instrument covered by this Notice, for the remainder of the flight. The prescribed period of 30 minutes is considered to be adequate to allow for appropriate crew action for this class of aircraft.

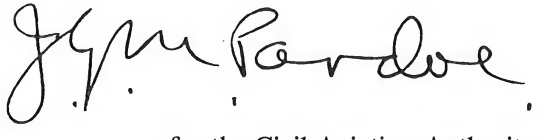
3.1.2 For those shorter range aircraft that are totally dependent on battery power to support all essential services to the completion of the flight, a period of 30 minutes assuming a crew delay time of 10 minutes, is the mandatory minimum endurance of the emergency supply for the horizon instrument prescribed in this Notice. It is, however, strongly recommended that in circumstances where the crew do take prompt and correct actions in response to warning indications of the interruption of all generated

electrical power, the aircraft installation should include adequate battery capacity to provide a 60 minute supply for both the subject instrument and the other services essential to complete the flight and make a landing.

3.2 A number of aircraft types already comply with the requirements of this Notice, or incorporate other special features which have been considered and accepted by the CAA as providing an equivalent level of safety. Such aircraft types, of U.K. construction, are listed in Appendix A.

3.3 In the case of most aircraft types, of U.K. construction, which do not comply, discussions have been held with the Aircraft Constructors. Owners and Operators of such aircraft are, therefore, recommended to contact the Constructor concerned for information regarding suitable modifications.

3.4 For future aircraft types it is intended to amend Section D "Aeroplanes" and Section G "Rotorcraft" of British Civil Airworthiness Requirements to call for a separate supply which, in the event of a failure of the main electrical supply, will be available automatically to a suitably illuminated bank and pitch indicator.



for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

APPENDIX A
AIRCRAFT TYPES OF U.K. CONSTRUCTION

1 The following aircraft types, as certified for use on the U.K. Register, are accepted as complying with the requirements of this Notice.

BAC 1—11	All Series
HSA Trident	All Series when fitted with two batteries

2 The following aircraft types require some crew action to ensure continuity of horizon information, or to achieve the required endurance, but nevertheless incorporate special features which have been accepted by CAA as achieving an equivalent level of safety.

Britannia 300 Series

Dart Herald 200 Series

VC. 10

Super VC. 10

AIRWORTHINESS NOTICE

No. 82

Issue 1.

7th June, 1973.

ELECTRICAL GENERATION SYSTEMS—AIRCRAFT NOT EXCEEDING 5700 kg MAXIMUM AUTHORISED WEIGHT

1 Introduction

1.1 Investigations into accidents and incidents involving total loss of generated electrical power to aircraft, the maximum authorised weight of which does not exceed 5700 kg, have shown certain inadequacies in the standard of failure warnings and indications provided. Experience has shown that the loss of generated electrical power can remain undetected for a significant period of time, resulting in the serious depletion of the available battery capacity and reduced duration of supplies to essential services under these conditions.

1.2 The purpose of this Notice is to publish requirements for the retrospective modification of certain aircraft to ensure that a clear and unmistakable warning of loss of generated electrical power is given, and to preserve or provide sufficient electrical energy to operate essential services for an adequate period of time in the event of such a loss occurring.

2 Requirement

2.1 For all multi-engined aircraft, the maximum authorised weight of which does not exceed 5700 kg, compliance with paragraphs 2.2, 2.3, 2.4 and 2.5 of this Notice, or with a CAA approved alternative providing an equivalent level of airworthiness, is required :—

(a) For aircraft certificated in the Transport and General Purpose Categories, as soon as practical, but not later than 31st December 1974.

(b) For aircraft certificated in the Private and Special Categories, as soon as practical, but not later than 31st December 1975.

2.1.1 Where it can be shown that an aircraft,

either (a) will be permanently removed from service prior to 30th June 1975 for aircraft registered in the

Transport or General Purpose Categories, and prior to 30th June 1976 for those registered in the Private and Special Categories,

or (b) is fitted with such limited electrical and radio equipment, or is certificated to operate under such limited conditions (e.g. V.M.C. day only) that the loss of generated electrical power would not significantly prejudice safe flight,

the CAA will, on application, waive the requirement of this Notice where it is satisfied that compliance would not be justified in the circumstances of a particular case.

2.2 Clear visual warning shall be provided, within the pilot's normal line of sight, to give indication of,

either (a) reduction of the generating system voltage to a level where the battery commences to support any part of the main electrical load of the aircraft,

or (b) loss of the output of each engine driven generator at the main distribution point or busbars.

2.3 The battery capacity shall be such that in the event of a complete loss of generated electrical power, adequate power will be available for a period of not less than 30 minutes following the failure, to support those services essential to the continued safe flight and landing of the aircraft, (see para. 3.1). This includes an assumed period of not less than 10 minutes from operation of the warning specified in paragraph 2.2, for completion of the appropriate drills. This delay period may be reduced to not less than five minutes if the warning system is provided with "attention getting" characteristics (e.g. a flashing light). For the purpose of calculations it shall be assumed that the electrical load conditions at the time of failure warning are those appropriate to normal cruising flight at night (see para. 3).

2.4 Where all gyroscopic attitude reference instruments, i.e. bank and pitch indicator(s) and turn and slip indicator(s), are dependent on electrical power for their operation, at least one of these instruments shall continue to operate without crew action for the prescribed 30 minute period.

NOTES: (1) For certain aircraft types a turn and slip indicator may not be acceptable as the sole remaining attitude reference instrument.

(2) Certain aircraft are equipped with both electrically operated and air driven attitude reference instruments. In such cases the air driven instrument(s) will be accepted as providing the emergency attitude information provided that the requirements of para. 2.4.1 are met.

2.4.1 The instrument(s) with which the requirement of 2.4 will be met shall be clearly designated, and,

(a) shall be so located on the instrument panel that it will be visible to, and usable by, the pilot from his normal position,

(b) shall be provided with means of indicating that the power supply to the instrument is operating correctly.

2.5 Precise drills covering crew action in the event of electrical generation system failures and malfunctions shall be included in the appropriate aircraft manual(s), together with a statement of the battery endurance under specified load conditions.

3 Additional Information

3.1 When ascertaining that the installed aircraft battery capacity is adequate for compliance with 2.3, the following loads should be taken into account:—

(a) Attitude information (where applicable in accordance with para. 2.4).

(b) Essential Radio Communication.

NOTE: For the purpose of calculations it will normally be accepted that intermittent use of a single VHF communication equipment satisfies this requirement. Utilisation on the basis of a total 15 minutes reception plus 3 minutes transmission in the 30 minute period would be an acceptable interpretation.

(c) Essential cockpit lighting.

(d) Pitot Head Heater (applicable only to those aircraft certificated for flight in icing conditions).

(e) Any other services essential for the continued safe flight and landing of the particular aircraft.

(f) Those services which cannot readily be shed when carrying out the drills required under para. 2.5.

3.1.1 In order to ensure that the essential services, taken into account in accordance with 3.1, will function adequately for the prescribed period, the calculation of the duration of battery supply should normally be based on the following assumptions:—

(a) Only 75% of the "name plate" rating of the battery is available (this is to take into consideration loss of capacity with age, and a realistic state of charge).

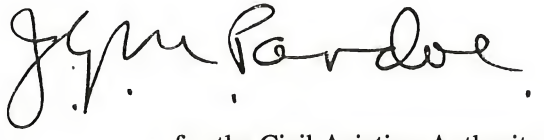
(b) The voltage/time discharge characteristic of the battery, appropriate to the load of the listed services, is not extended beyond a battery terminal voltage of 21·5 volts on a 24 volt system, pro rata for 12 volt systems, (this

is to ensure that the voltage available throughout the prescribed period is adequate for satisfactory operation of the services).

NOTE: Only where compliance with this Notice cannot be shown within the criteria of paragraphs 3.1 and 3.1.1, will consideration have to be given to the fitment of additional, or larger capacity, batteries to particular aircraft.

3.2 Applications for the approval of modifications necessary to ensure compliance with the requirements of this Notice should be made in the manner specified in B.C.A.R. Chapter A4-1.

3.3 Discussions have been held with most of the constructors of aircraft which do not already comply with this Notice. Owners and operators are therefore recommended to contact the constructor concerned or the main agent for information regarding suitable modifications.



for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

AIRWORTHINESS NOTICE

No. 83

Issue 1.

22*nd August*, 1974.

FIRE PRECAUTIONS — AIRCRAFT TOILETS

1 Applicability This Notice is applicable to all aircraft over 5700 kg operating in the Transport Category (Passenger).

2 Introduction

2.1 In view of the history of in-flight fires which have occurred in the toilet compartments of large transport category aeroplanes, a survey has been conducted to re-appraise the fire precautions on the various types of aircraft used by UK operators.

2.2 The results of this survey have shown that in some instances the design of receptacles (e.g. towel dispensers, waste containers), provided within toilet areas for the carriage of flammable materials and in particular flammable waste, does not comply with the current interpretation of published airworthiness requirements. In other instances the receptacles are not sufficiently robust to withstand the effects of wear and deterioration in service. The survey also showed that, regardless of notices prohibiting smoking in toilets, smoking does occur, and that, even when ash trays are provided, they are often not used, and cigarette ends are deposited in other receptacles.

2.3 The purpose of this Notice is to publish requirements aimed at reducing the probability of persons smoking in toilet compartments and at minimising the potential fire hazard caused by persistent smokers.

3 Requirements

3.1 Inspection

3.1.1 Within one calendar month of the date of this Notice the following shall be done :—

(a) All receptacles shall be inspected to ascertain that all entry flaps or doors still operate, fit, seal and latch correctly.

(b) Any defects revealed by the inspection of (a) are corrected.

3.1.2 The inspection prescribed in 3.1.1 shall be repeated at 1,000 hourly intervals, or at such other intervals as may be agreed with the CAA on the basis of available data. This inspection shall be included in the Maintenance Schedules using the normal procedure.

NOTE: Compliance with FAA Airworthiness Directive 74-08-09 Amendment 39-1818 paragraph (d) will ensure compliance with paragraph 3.1.

3.2 **Prohibition of Smoking in Toilet Compartments**

3.2.1 Smoking shall not be permitted in toilet compartments.

3.2.2 Within 3 months of the date of this Notice No Smoking placards and ash trays are required both inside and outside these compartments.

3.2.3 The No Smoking placards shall be displayed so as to be prominent to, and the ash trays shall be obviously and conveniently placed for, those about to enter and those within these compartments.

3.3 **Re-Assessment**

3.3.1 Except where agreement has been obtained from the CAA that compliance would not be justified in the circumstances of a particular case, within one year of the date of issue of this Notice the design of all receptacles provided in the toilet compartments of aircraft over 5700 kg, certificated in the Transport Category (Passenger), shall be re-assessed against paragraph 4 of this Notice, and proposals shall be made by the operators of such aircraft to the CAA for the incorporation of modifications necessary to show compliance, including a date (to be agreed by the CAA). The operator should consult the aircraft manufacturer regarding such modifications.

3.3.2 In the case of British manufactured aircraft, the CAA is discussing with the aircraft manufacturers suitable modifications to ensure compliance with paragraph 4 of this Notice.

4 Interpretation of Requirements

4.1 BCAR Section D, Chapter D4-3 para. 9 states that "all receptacles for used towels, papers and waste, shall be constructed of materials resistant to fire. The receptacles shall incorporate covers or other provisions for containing fires if started in the receptacle".

4.2 For compliance to be shown, such receptacles (but see 4.4 for towel dispensers) shall be constructed of materials which

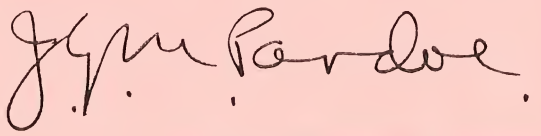
are flame resistant,* and which in addition, will retain sufficient mechanical properties as to contain such a fire as may develop by burning of materials such as paper towels, as may be within the receptacle. (It should be noted that although a thermoplastic material may be "flame resistant" it would not necessarily retain adequate mechanical properties in the case of a fire). The receptacle shall be completely enclosed with the exception of a self closing entry flap or door, which itself shall be rigid, and when closed form as air-tight a seal as is practicable. Entry flaps or doors shall be designed so that they remain self closing even after exposure to a fire within the receptacle.

4.3 It is however, permissible for receptacles to be open topped provided that they are mounted in a cabinet which itself complies with 4.2. In this instance, the door of the cabinet shall be of a robust construction and such as to ensure an adequate seal and to withstand misuse in service. Such cabinets shall not contain other flammable materials, potential fire sources (e.g. electrical apparatus) or apertures which would either allow air to feed a fire or permit a fire to spread beyond the cabinet (e.g. through apertures provided for services).

4.4 It is accepted that some receptacles, e.g. paper towel dispensers, cannot readily be designed to meet the above requirements. In such instances they shall be so designed and positioned within the compartment to ensure that :—

(a) the likelihood of the depositing of cigarette ends, etc., into them is minimized, and

(b) a fire, which could be expected to start in another container, cannot readily spread to them; for example, a paper towel dispenser must not be positioned adjacent to, or immediately above, either the entry flap or door of a waste container or an ash tray provided in the compartment.



for the Civil Aviation Authority.

Airworthiness Division,
Brabazon House,
Redhill, Surrey RH1 1SQ.

*Suitable methods for flame resistance testing are contained in Specification No. 8, available on application from the CAA (AD), Brabazon House, Redhill, Surrey RH1 1SQ.